

An AIR AGE Publication

MODEL AIRPLANE NEWS



Douglas HAYO

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Will you be thoroughly trained? You'll get training that can't be beat! You'll be instructed by Aces who have been in actual combat in every theater of war . . . men who know how to teach you the "tricks of the trade" that will make you a finer flyer and a better fighter than your enemy.

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And after the war you will be qualified for leadership in the world's greatest industry—Aviation!

How can you qualify to win your Army wings?

You, too, belong on this fighting team—the U. S. Army Air Forces—as a Bom-

bardier, Navigator or Pilot! And here is what you can do about it right now.

If you are 17 but not yet 18 . . . go to your nearest Aviation Cadet Examining Board . . . take your preliminary examinations to see if you can qualify for the Air Corps Enlisted Reserve. If you qualify, you will receive your Enlisted Reserve insignia . . . but will not be called for training until you are over 18.

If you are 18 but under 27 . . . go to your nearest Aviation Cadet Examining Board . . . see if you can qualify as an Aviation Cadet. If you are in the Army, you may apply through your commanding officer.

If you are under 18 (whether or not you have joined the Air Corps Enlisted Reserve) . . . see your local Civil Air Patrol Officers about taking C. A. P. Cadet training—also see your High School adviser about taking H. S. Victory Corps prescribed courses. Both will afford you valuable pre-aviation training.

For complete details—see your nearest Aviation Cadet Examining Board, the commanding officer of the College Training Detachment nearest you or your local Civil Air Patrol.

(Essential workers in War Industry or Agriculture—do not apply)

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"Nothing'll Stop the Army Air Corps"

KEEP 'EM FLYING!

For information regarding Naval Aviation Cadet Training, apply at any Naval Aviation Cadet Selection Board or any Naval Recruiting Station; or, if you are in the Navy, Marine Corps or Coast Guard, apply through your commanding officer . . . This advertisement has the approval of the joint Army Navy Personnel Board.

15TH YEAR OF PUBLICATION

MODEL AIRPLANE NEWS

DECEMBER, 1943

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THIS month has seen considerable progress by the United Nations on all fronts, progress which has not meant any outstanding tactical military gains but valuable strategic gains. These gains are valuable in that they mean extension of offensive Airpower by the seizure of important air bases. In the Italian campaign the British 8th Army's capture of Foggia and its string of no less than 13 airfields has been an immeasurable prize, for it now means the range of our fighter planes has been moved to within striking distance of such Nazi centers as the whole of Yugoslavia; Bucharest and Ploesti in Rumania; Sofia in Bulgaria; Budapest, Hungary; Vienna, Prague, Munich, Frankfurt, Mannheim and Augsburg in Germany.

Our bombers are now within easy cruising range of these centers of military industry and concentration. Increased bomb loads can now be escorted to and from their targets by fighter planes, thereby nullifying the effect of Luftwaffe fighters which have done some damage to them in the past.

The fall of Corsica, engineered largely by Free French troops battling the Nazis for the first time since the subjugation of their homeland more than two years ago, further extends our fighter range to cover the greatest portion of France, the entire Saar Basin and extensive German heavy industries there, and the greatest portion of Germany itself. These two strategic moves have placed our Airpower in a prime position to begin real assault on the Reich with heavy bombardment formations accompanied by full fighter protection completely to the target and back again. Although the Fortresses have done a remarkable job in the past on unescorted raids, even ringing up huge scores of enemy fighter planes, we can confidently expect these raids to bear greater fruit at greatly reduced costs with fighter protection.

These facts hold equally true in the capture of Finschhafen by Australian troops under MacArthur. Fighter bases here now open the road for all-out aerial assaults on Japanese positions on the north coast of New Guinea including Medang and Wewak and the vital enemy stronghold of Rabaul on New Britain.

These battles for fighter bases are prime elements of our worldwide campaign and are not merely secondary results of primarily infantry and artillery conquests. It would be costly to attempt to win the Battle of Europe by actual capture of every square foot of Nazi-held territory including Germany itself and the capture of every soldier of Adolf Hitler. It would be madness to attempt to capture every Jap-held island in the Pacific by an island-to-island campaign. It could be done, certainly,

but 1945 would not see its accomplishment, nor would 1950. And we most assuredly do not intend to prolong this war until such a date as 1950.

But we can and will defeat the enemy by pounding his industry to destruction, interrupting his communications and lines of supply to uselessness, terrorizing his cities and military concentrations to paralysis, causing his loss of will to win, of strength to carry on the fight.

These things we can do by Airpower and by Airpower alone. Aerial bombardment can and will bring these things about, and more quickly by bombers protected by convoying fighter planes. These latter need bases within their effective range from which to operate. Thus is the recent news an important development.

The extent to which our aerial strength was strained in protecting the initial Italian landings at Salerno was revealed recently by General Henry H. Arnold. Speaking in Seattle, Wash., at the opening of a drive to recruit workers for Boeing Aircraft, he said: "Every plane the Allies could get off Mediterranean soil was thrown into the battle and yet it very nearly wasn't enough. The invasion would not have been possible with any fewer planes. As a matter of fact, we had to gather these planes together from every possible source, from our training centers, depots, modification centers, to do the trick. The task would have been easier with more planes; it could not have been done with less." In describing the famed Boeing Flying Fortress, General Arnold described it as "the outstanding heavy bomber of the war, praised to the skies by the Allies and damned to hell by our enemies!"

Nearly a year has gone by since Battleship "X" of the United States Navy poured new fuel into the old argument about airplanes vs. battleships by shooting down no less than thirty-two Japanese airplanes in a single attack. The Navy Department has permitted news to be released that the vessel was actually the U.S.S. South Dakota, one of a new class of dreadnaughts far heavier and more powerful than any used heretofore in the world's navies. Under command of Captain (now Rear Admiral and Judge Advocate General of the Navy) Thomas L. Gatch, the huge South Dakota was attacked by Japanese dive bombers. The anti-aircraft aboard the battleship went into action and twenty enemy aircraft fell into the sea. Later a second dive bomber group of 40 planes attacked the ship and all of them either fell into the sea from the withering blast of fire or turned back. Then a third attack followed during which the mighty total of 32 were

(Continued on page 48)



HI FELLOWS: IT'S BEEN A LONG TIME SINCE I STUCK MY HEAD IN HERE, BUT I'VE REALLY GOT SOME BIG NEWS FOR YOU MODELERS! Barney

OHONOTE!

No, gang, I'm not putting the Indian sign on you with a secret password. Ohonote (pronounced ho-NO-tee) is the name of a wood from Mexico that's got everything the model builder wants. First cousin to our old friend Balsa, Ohonote is stronger and more durable but just as workable. And it's not a strategic material! For dyed-in-the-wool Balsa fans we have recently purchased a lot of scrap Balsa from life raft manufacturers. This is for sale at our good old low prices. ALL our Modelcraft models (starting a month ago) now have printed Balsa sheets, and all kits will be supplied in either Balsa or Ohonote or both from now on.

OWN THESE REALISTIC MODEL CRAFT FLYING MODELS



CATALINA PBY

Built-up flying type scale model of this famous patrol boat that's a joy to behold. Scale $\frac{1}{4}$ " to ft. \$1.95
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BOEING B-17

Here's a whale of a flying type scale model of the latest Flying Fortress. Nearly 27" wing span. $\frac{1}{4}$ " to ft. \$1.95
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MISS TINY

Still the best flyer ever designed.
Miss Tiny looks and acts just like a big plane. She obeys your every command. Queen of Class A aviator-type ships. The best Christmas present of all! Wingspan is 46".
Standard kit. \$3.25



TODAY'S SERMON
By Barney

Maybe it will be a long war and maybe it won't. But wouldn't you feel like a dope if the Government put through a draft of all manpower of 14 yrs. and older and the only job you were fitted for was emptying wastebaskets? Your experience as a modeler will equip you for work in any aircraft plant in the country, and at good wages.

ANOTHER REASON

why we're not getting out orders as fast as we'd like to!

This is a snapshot of Dean Anthony. He was our ace packer. But the Navy needed Dean, so he's now somewhere in the South Pacific as Electrician 3rd Class. Keep on buying those War Bonds so we can get Dean and other Modelcrafters back soon, will ya?



THE JAP ZERO

Detailed $\frac{3}{4}$ " flying scale model of the vaunted Jap Zero. Build one just to see how much BETTER Uncle Sam's planes are! \$1.95
Add 15c postage



BELL AIRACOBRA

The guys in North Africa can tell you this Bell Airacobra is just as deadly as the cobra snake it's named after! $\frac{3}{4}$ " to foot scale, flying model. \$1.95
Add 15c postage



SHOW THIS TO DAD!

Just kinda leave this ad around where Dad'll see it. It'll help him choose something you really want for Christmas. Better do it now—while it's handy.

THEY CAN TAKE OUR NAME BUT THEY CAN'T DUPLICATE OUR MERCHANDISE!

Modelcraft
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7306 So. Vermont Ave.

Los Angeles 44, California



SHOW THIS TO MOM!

Just in case Dad doesn't take the hint, play safe and show it to Mom, too. Nothing like doing a good job and saving your folks a lot of hard thinking.

THE DRAFT AND YOU

We are in a hard war . . . IF YOU ARE 16 or 17 . . . you have the opportunity of a lifetime. Help your country to VICTORY and at the same time TRAIN yourself for a CAREER in Aviation. See Curtiss-Wright Technical Institute ad on page 5—MAIL COUPON TODAY and include your birth date, for vital information.

SUPER-CYCLONE OWNERS

As previously announced, the manufacture of the SUPER-CYCLONE was suspended in April, 1942, for the duration of the war. We have no more engines for sale. The resources of this Company and affiliated Companies are devoted to the winning of our peace. When this is achieved, our engineers will again develop the same high-quality engines we have manufactured in years past.

While, during this period of suspended manufacture, we cannot render to you engine-owners our customary engine repair service we still have many of the replacement items in stock. Send for your copy of our up-to-date Parts List and keep your present Cyclone in service.

AIRCRAFT INDUSTRIES CO.

Grand Central Air Terminal, Glendale, California

HOME OF THE FAMOUS
CURTISS-WRIGHT TECHNICAL INSTITUTE

SUPER-CYCLONE



CURTISS-WRIGHT TECHNICAL INSTITUTE STUDENTS

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This enrollment from worldwide sources is significant. CURTISS-WRIGHT TECHNICAL INSTITUTE, one of the oldest and most progressive aeronautical schools, located in the heart of Southern California's giant aircraft industry, is recognized the world over as an institution offering the highest type of Specialized Aviation Mechanical and Aeronautical Engineering Training available.

Offering specialized and proven training in Aeronautical Engineering and Master Aviation Mechanics

NO FLYING INVOLVED

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Contractor to the U. S. Army Air Corps

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This specialized modern up-to-the-minute training has been proven by the success of thousands of CURTISS-WRIGHT TECHNICAL INSTITUTE graduates in all phases of aviation activity, both civil and military. All with exceptional value to the war effort.

The high standing of CURTISS-WRIGHT TECHNICAL INSTITUTE is indicated by Mr. Donald Douglas, President of the great Douglas Aircraft Company, in choosing this school for his own son's training. In addition, this school was selected to train Army Air Force mechanics by our government in 1939, long before the war.

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MAIL TODAY • DON'T DELAY

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N-12



The use of fighters and pilots for the interception of enemy planes at night is a difficult precision job which the Allies have mastered

WITH the tempo of saturation bombing increasing daily, one hears more and more of night fighter interception—a part of aerial warfare that is a definite science in itself.

Bombers who cross the lines both into enemy territory and in raids on the British Isles have to contend with a form of defense which has increased month by month since 1939. Break a bomber attack before he has achieved his objective and he will lay his eggs in the most convenient spot and make a run for it. That is true so far as the Axis are concerned. Fortunately, our young manhood is undeterred and despite increased and ever-active fighter interception, they battle their way through to their target; but that is no picnic for the pilots or the crewmen who man the bomber.

With regard to the night fighter pilot, he has to be one hundred per cent physically and mentally fit, his vision must be

a perfect 20/20 and furthermore he is required to undergo special tests for night blindness. Then there must be no trace of color blindness. He must have the physique to withstand rapid ascent to high altitudes, so that apart from his flying ability and accuracy as a marksman he has to contend with the medical branch; for aviation medicine enters not only into selection of night fighter pilots, but after they are selected a very close watch is kept on each individual while he is operating under night combat conditions.

First, a pilot after he has satisfied the officers in charge of his flying abilities and gunnery, has to satisfy the medical branch of his mental ability to take the physical punishment night fighting entails. Continuous night flying in peace time is recognized as putting a greater strain on a qualified pilot than operating in daylight. The hazards are greatly increased under war conditions.

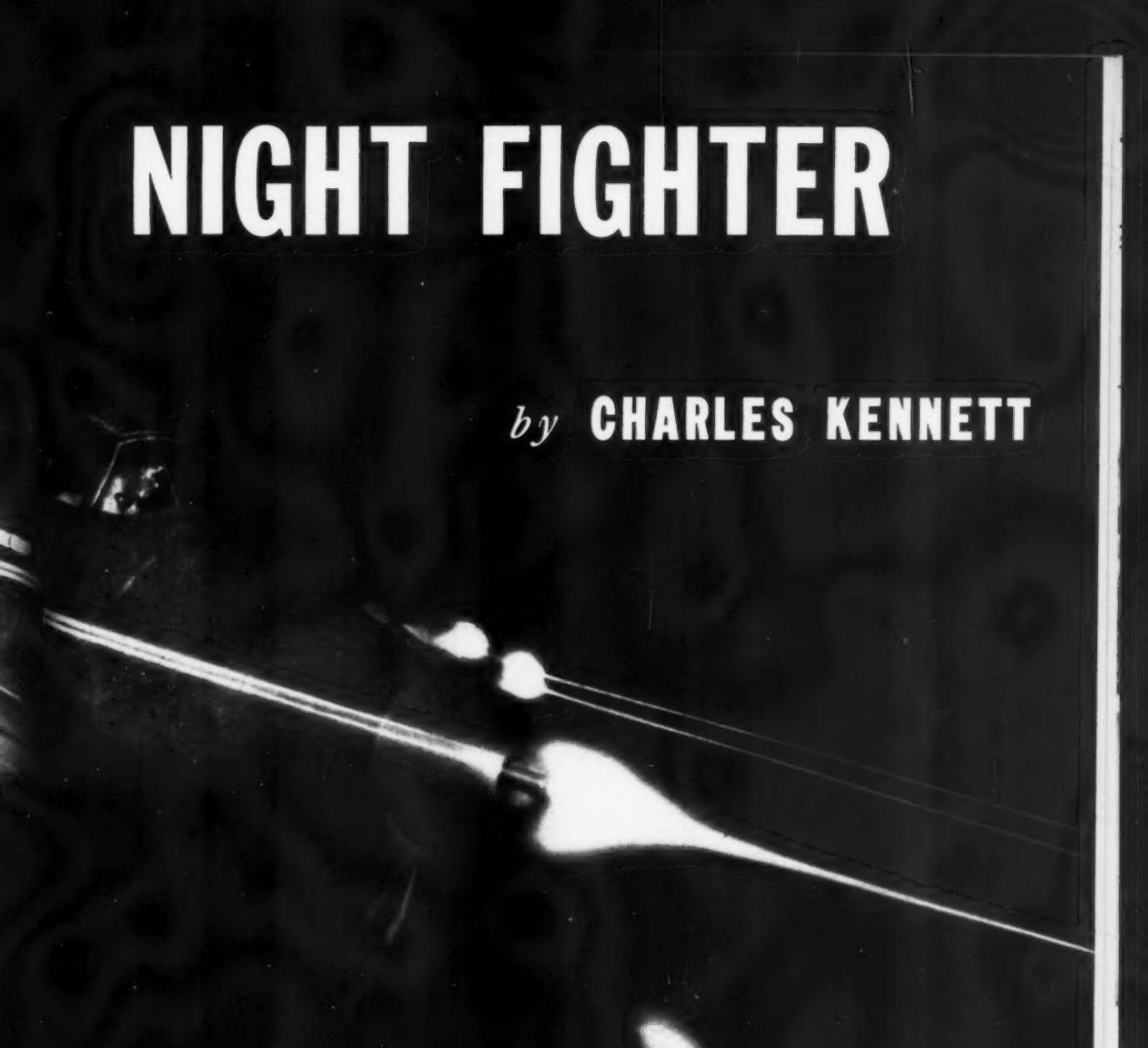
In the first place a pilot flying over battle areas over which there is a complete blackout has to revert to a great extent to the old time method of "flying by the seat of his pants"; that is, he has to fly by the feel of his ship. With the constant staring ahead into the violet blue darkness of the upper air he cannot continuously keep his eyes fixed on his compass, rate of turn, airspeed indicator, rate of climb, turn and bank, for he has plenty of other things to do.

At the alert, and the cry of "bandits upstairs", he has to climb and climb fast. His time is fully engaged with manipulating his oxygen and manifold pressure so that when he arrives at the altitude ordered to attain, he will arrive there physically equipped for combat due to proper regulation of his oxygen and the fact that his engine will be functioning correctly on his boost.

Before going any farther with his actual

NIGHT FIGHTER

by CHARLES KENNEDY



work upstairs, we must appreciate the importance of sight. The normal requirements for a pilot are a visual acuity of 20/20. Apart from that there are three other definite requirements needed for a night fighter pilot.

The first, depth perception. From practical experience of twenty-six years military and civil flying we have found that although at the six months' physical examination depth perception on test is perfect, in actual practice we are apt to slightly overshoot when landing along a flare path, so that we always allow ten feet below normal depth perception before levelling off on a night landing. By that means, which is purely practical experience, we do not land ten feet up, neither do we fly into the deck. Therefore night flying needs constant practice.

Second, color blindness.

Concerning color blindness there are two separate tests which are applied. The

Ishihara consisting of a book, on each page of which is a sphere of mottled colors; some of the plates carry figures, others do not. Medical science has evolved this test which ensures by the pilot's readings whether he is color blind or not. The extent of color blindness allowed can be judged from the wool yarn test in which the pilot has to select various colors, and to demonstrate the rigorousness of this examination he must be able to distinguish between ten shades of green, eight shades of brown and six shades of gray.

Third, normal ocular function.

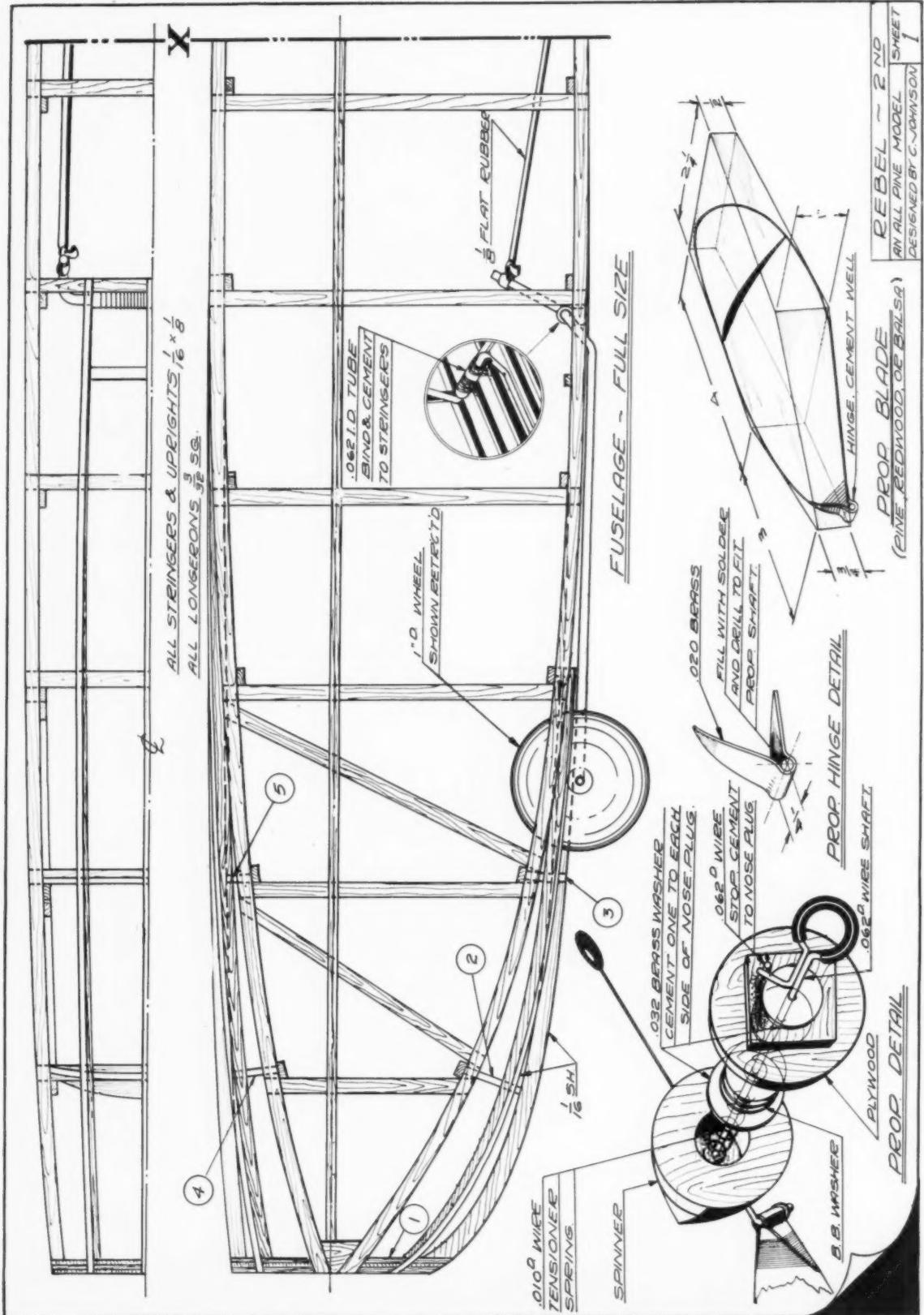
In a similar way the doctor meticulously examines, under the ophthalmoscope, the full refraction so as to ensure normal ocular function. It is an actual fact that carrots eaten in a raw state materially assist night vision and are therefore included in the diet of those engaged on night combat duty where there is the

usual cry of disgust in the mess:—"What, carrots again?"

Whilst speaking of diets a pilot who has to climb above the normal 300 feet per minute as laid down by the Civil Air Regulations, and where he may be climbing as fast or faster than 2,300 feet per minute, he will automatically suffer from gases in the stomach. Therefore he has to watch his pulse foods such as beans, etc. as they promote gas and if eaten a short while before a rapid ascent, will lead to distension and acute pains in the stomach.

There is one more medical feature which has to be taken care of, especially where the night fighter is concerned; due to the fact that when he goes into action it is usually at very short notice where the pilot will be called upon to climb to anywhere between twenty and thirty thousand feet as rapidly as possible. The

(Continued on page 34)





HARDWOOD FPLIER

This pine model solves balsa problem

by CALDWELL JOHNSON



THE Rebel "2" was designed and built to take advantage of the present balsa shortage and availability of pine.

The result of this venture into the hardwoods was as pleasant as our previous experience with balsa models. While it may prove more difficult to keep the weight down, pine models are, without doubt, much stronger than similar balsa jobs. Designing around double curved surfaces, solid fillets and cowls will enable almost any modeler to keep the finished weight to but little more than all-balsa construction. We believe that by replacing certain parts, formerly made of balsa, with pine (spars, stringers, leading edges, etc.) a stronger cheaper model and a saving of scarce balsa will result.

CONSTRUCTION: By joining the plans at x-x full size outlines of fuselage, wing and tail tips, and fin are convenient to work with, after tracing the bulkhead formers and sheet parts on to the pine.

Use generous cement fillets at the joints that are generally the highest stressed and avoid butt joints where possible.

FUSELAGE: Lay down the fuselage sides over the plan, being sure there will be a right and left hand side when removed. Attach the plywood nose piece and formers. The crosspieces are added and when the cement has set attach the stringers and reinforcement at the tail. If the bottom stringers at the nose are too difficult to bend cut them from 1/16" sheet pine. Bind the landing gear hinge (.0625 I.D. tubing) to the lower stringers after forming the .0625 D. wire landing gear strut in the tube. Attach the retracting rubber and adjust the landing gear stop to allow the strut to fold back past the vertical so the model's weight will keep the landing gear from retracting. 1/16 x 1" D. plywood will serve as a wheel if a suitable bushing is used. Cover the completed fuselage frame with tissue. For extra resistance to tearing double tis-

sue should be used on the underside of the nose.

TAIL PIECE: Construct the tail piece much as was done the fuselage. Cut the lower fin from 1/16" sheet and cement in place. Form the hinges from about .020 steel wire and after lining up the tail piece with the fuselage cement the hinges in place so that the tail will fold upwards. After covering attach a short length of rubber from the lower fuselage longerons to upper members of tail piece so that when the tail is folded past vertical the rubber will hold it in place.

PROPELLER AND NOSE PLUG: Don't let the rather drastic departure from conventional folding prop scare you. The blade will not flop forward in flight as you might first expect because of the high centrifugal force compared to the thrust force. This type of folder will give a much smoother flight under power. (This type folder has no advantage when used on a two blade prop.) Carve the blade from pine, redwood or balsa and cement on the brass hinge fitting and bind with thread. The nose plug is cut from 1/16" plywood with brass bushings cemented to either side. Bend the rubber hook of the shaft and assemble with BB washer, tensioner spring and plain wash-

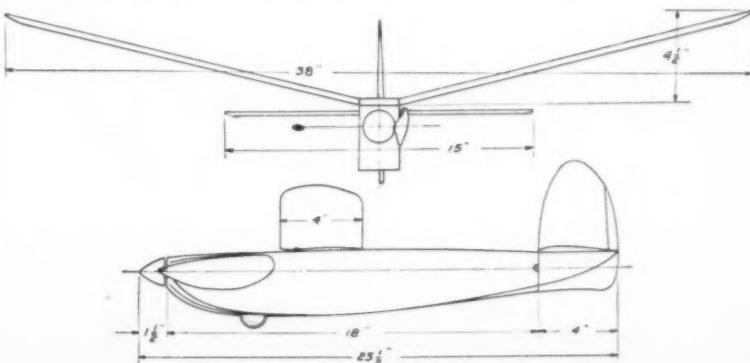
ers. Cut out the rear ring of the spinner from pine and slip over shaft end. Bend the two remaining angles in the shaft and bind on the counterbalance arm. Assemble with prop blade and fuselage. Cement wire stop to the rear of the nose block, after locating best folding position of blade (right side of fuselage). Add solder to obtain proper balance to counterbalance arm. Complete nose spinner.

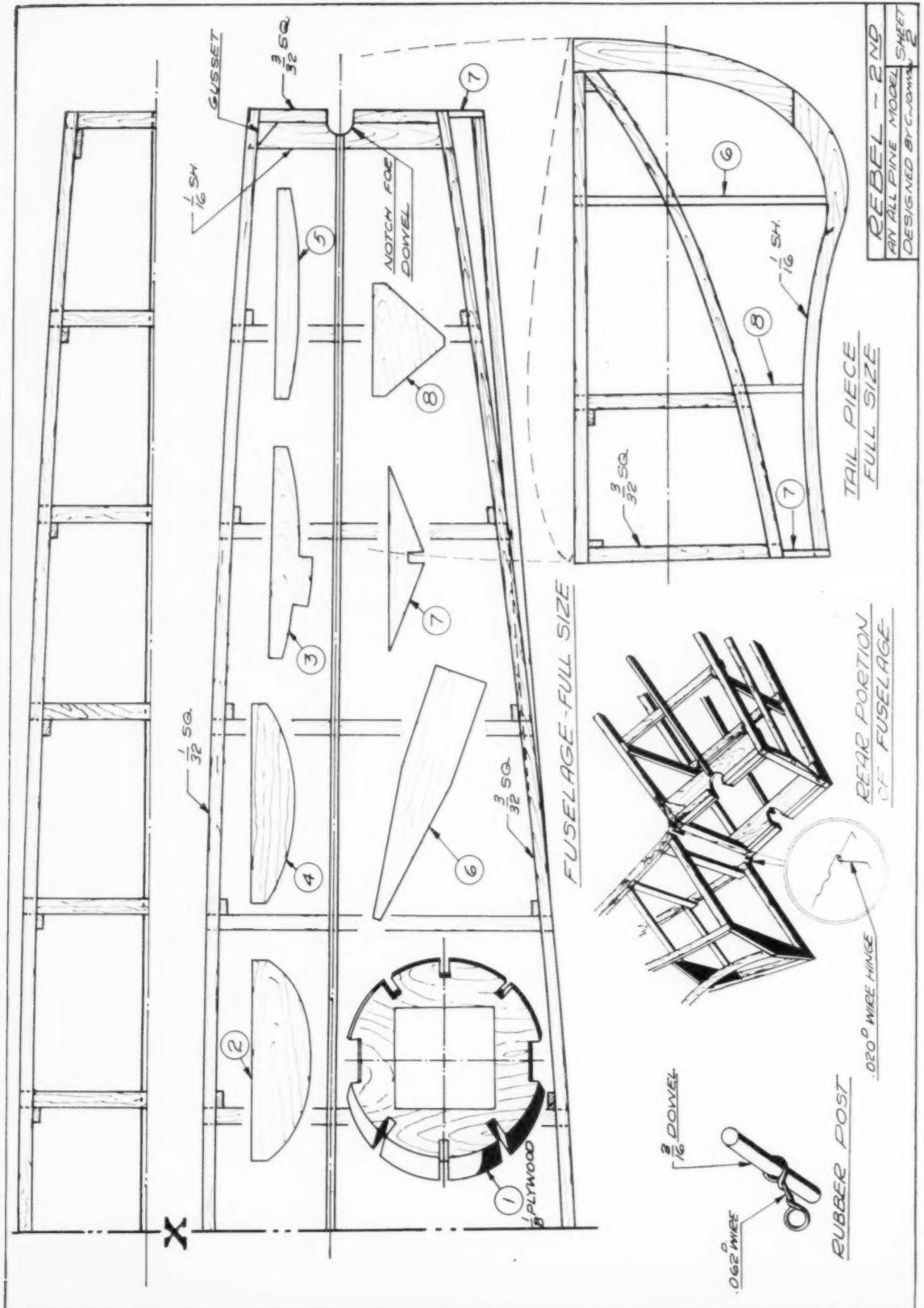
TAIL AND WING: Tail surfaces and wing are of conventional structure. Use full size outlines for tracing 1/16" tips. Ribs can best be cut out by tacking together rectangular pieces of 1/32" sheet with dope and sawing on band or jig saw. Cover all surfaces with tissue.

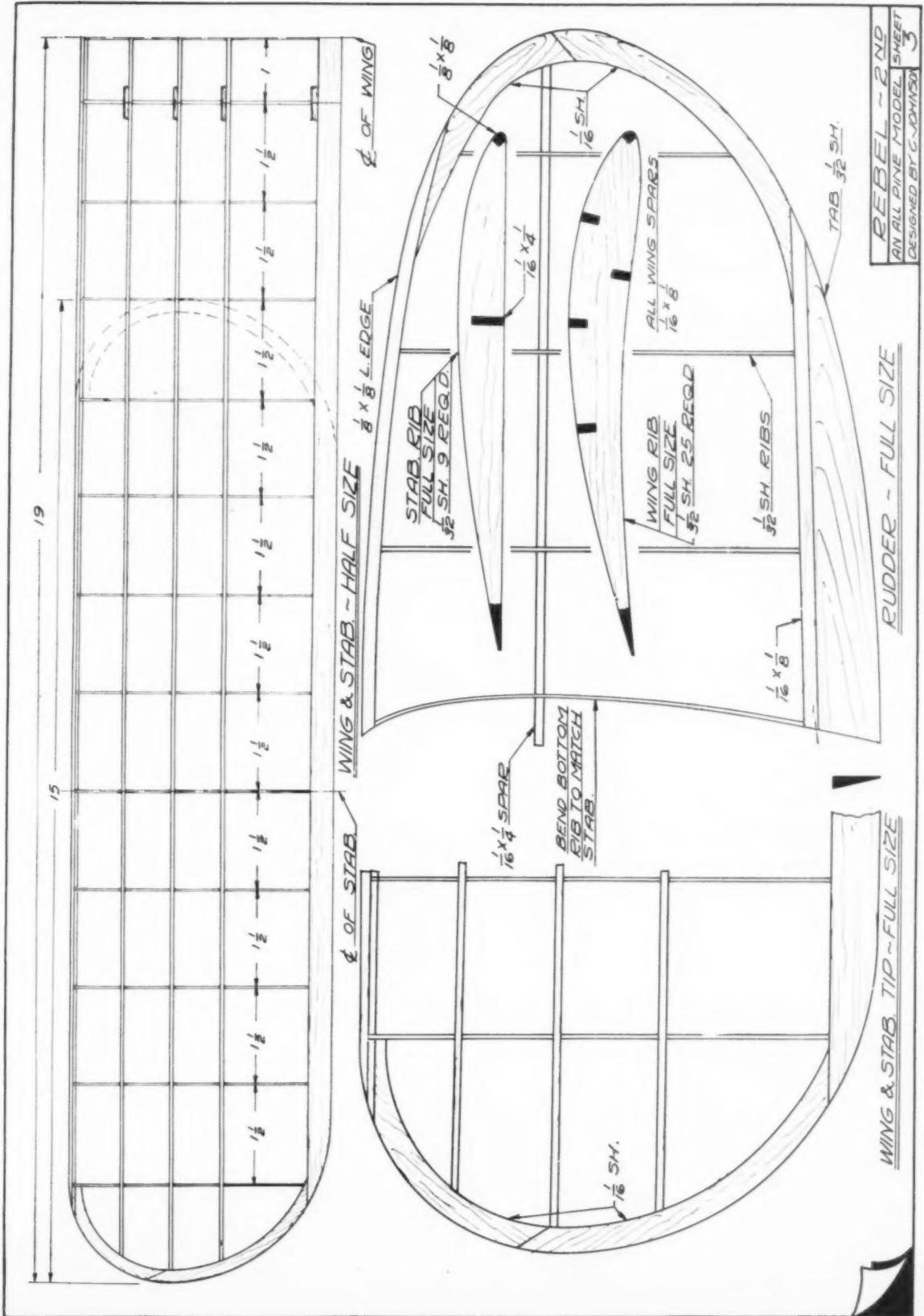
FLYING: The power is supplied by 12 strands of 3/16" rubber fastened to and wound from rear dowel by folding the tail assembly.

Adjust for a flat and slight left turn glide. Wind a few turns and adjust by shimming nose block until model turns right under power. For full power flights launch slightly left of the wind and be prepared for a chase. Aside from torn covering little damage is ever done to these pine jobs.

VICTORY









**Picture news from the
air-war battlegrounds**

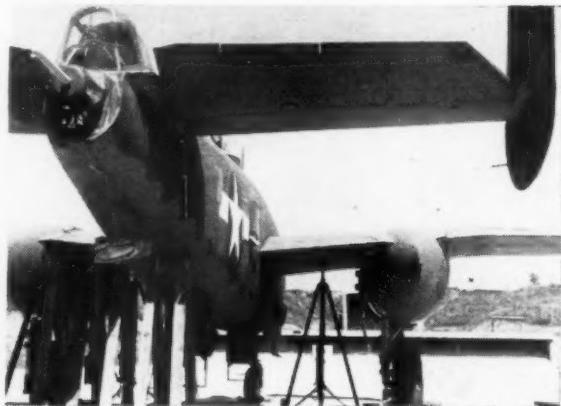


FRONTIERS

The Navy's powerful new Grumman (F6F) Hellcats drawn up in battle array. Woe betide Jap Zeros!



New Douglas (P-70) Havoc carries lethal nose. See pg. 25



Additional armament for the North American (B-25) Mitchell



Consolidated (PBY) Catalina air-sea rescue flying boat lands beside the crew of disabled Flying Fortress downed off Sardinia



A Consolidated PBY-5A amphibian coastal reconnaissance plane patrols Aleutian waters now deserted by the Japs. Just in case!



From front or back the new Martin (B-26) Marauder is deadly!



This is a rough idea of the size of a Lancaster's 8000-lb. bomb!



Republic (P-47) Thunderbolt tries its guns. Eight 50's in all!



Lt. D. L. Balch, USMC, brought his riddled Corsair down safely.



Wellington bomber equipped with 2 1-4 ton ring used to explode magnetic mines. Current produced by Ford V-8 engine.



Spoils of war! Here is a Japanese Zero that crashed near Lae airport, New Guinea



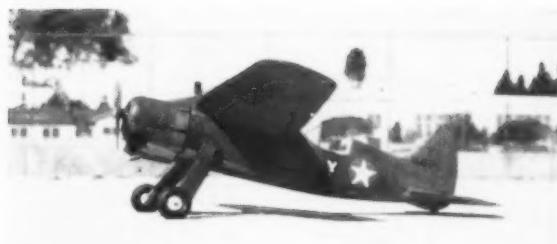
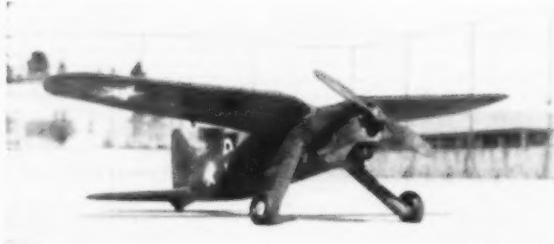
Here are more Zeroes that were destroyed on Munda airfield by ground strafing Yanks



A closeup of badly peppered tail surfaces of Jap Zero fighter. Fabric was blown off



Mysterious new Jap bomber that greatly resembles Fortress. Nakajima 19 probably



CONTROL LINE FIGHTER

A beautiful gull-wing fighter gas job

INTRODUCTION: Although this model was originally designed as a free-flying gas model, the popularity of control-line flying and the problems of transportation to flying fields due to gas rationing prompted us to convert it to a control-line airplane. As such, it is larger than most control models, and therefore slow, compared to the freaks that whizz around every parking lot nowadays. The beginner in control line flying, who has already made one or several free-flyers, will welcome this model as a transitional stage between free-flyers and control-liners. It is complicated enough to demand some work in construction, and yet not beyond the abilities of the average model-builder. The author will gladly answer any questions concerning the building of the model and can also furnish full-size blueprints if necessary.

This model was designed around a Bunch "Tiger" and flew very well with this power plant. Of course, other class "C" engines are adaptable and only slight revisions in the engine mount and the cowling will be required.

Reading the Plans: In reading the plans, note particularly that only major dimensions have been given. We do not believe in cluttering up the drawings with many dimensions, inasmuch as most dimensions can be scaled directly off the plans or gotten from the manuscript.

The fuselage is dimensioned according to stations where formers or bulkheads are used; thus, Sta. 12 3/4 for example, is the station which has holes cut in it for the aft end of the engine mount and is shown in Section D-D. It is 12 3/4 inches aft of the rear face of the propeller, which is a very convenient place to measure from. The same holds true for the vertical and horizontal tail surface ribs, and for the wing stations. All of these stations are measured from the intersection of the center line of the airplane, and the thrust line. It will be necessary to lay out full size, all the fuselage bulkheads and formers, and for this purpose, a typical fuselage station with offsets is given on Page 2 of the plans.

One more important factor must be considered before manufacture is begun—that is the scarcity of balsa. If you were one of those far-seeing guys who stocked up on balsa before it got so

by PETER W. WESTBURG

scarce, the bill of materials will not bother you much. However, if you have to use the so-called "hard woods" the optional hard wood sizes will be noted as we progress.

Engine Mount: Let us begin by making the engine mount. It is made of three pieces: one engine support piece, and two stiffeners. They should all be made of spruce or pine, preferably the former. The support is 1/4 inch thick, and referring to Page 1, we find it is 2 3/8 inch wide by about 13 inches long. Make the cutout for the engine first and true up the center line of the engine with the center line of the part. Drill the engine attach holes through. Locate Sta. 12-3/4 on the aft end and make the cutout, leaving two prongs, as shown, which are 1/4 x 3/8. Round off the ends so they may be easily pushed into the bulkhead at this station.

Make the stiffeners, which are 1/4 x 3/8 x 7-3/4, and shape them as shown in the side view. Note that the engine lugs fit between the stiffeners and support. Drill the engine attach holes in the stiffeners and assemble support, stiffeners, and engine with the engine mounting screws. Use a good grade of casein or resin glue to glue the stiffeners to the support. Clamp the stiffeners securely and when dry, drill the 1/8 diameter engine mount attach holes between Sta. 5-3/16 and Sta. 7-3/4. Be sure that the stiffeners are parallel to the center line of the support. Forward of Sta. 5-3/16 on the engine mount, there are two side pieces which are 1/4" thick, and are of the same contour as the outside surface of the fuselage. They should be made of soft pine and glued on at this time. After the engine mount assembly has dried, remove the engine and give the whole assembly two or three coats of shellac or clear varnish. This will prevent oil and

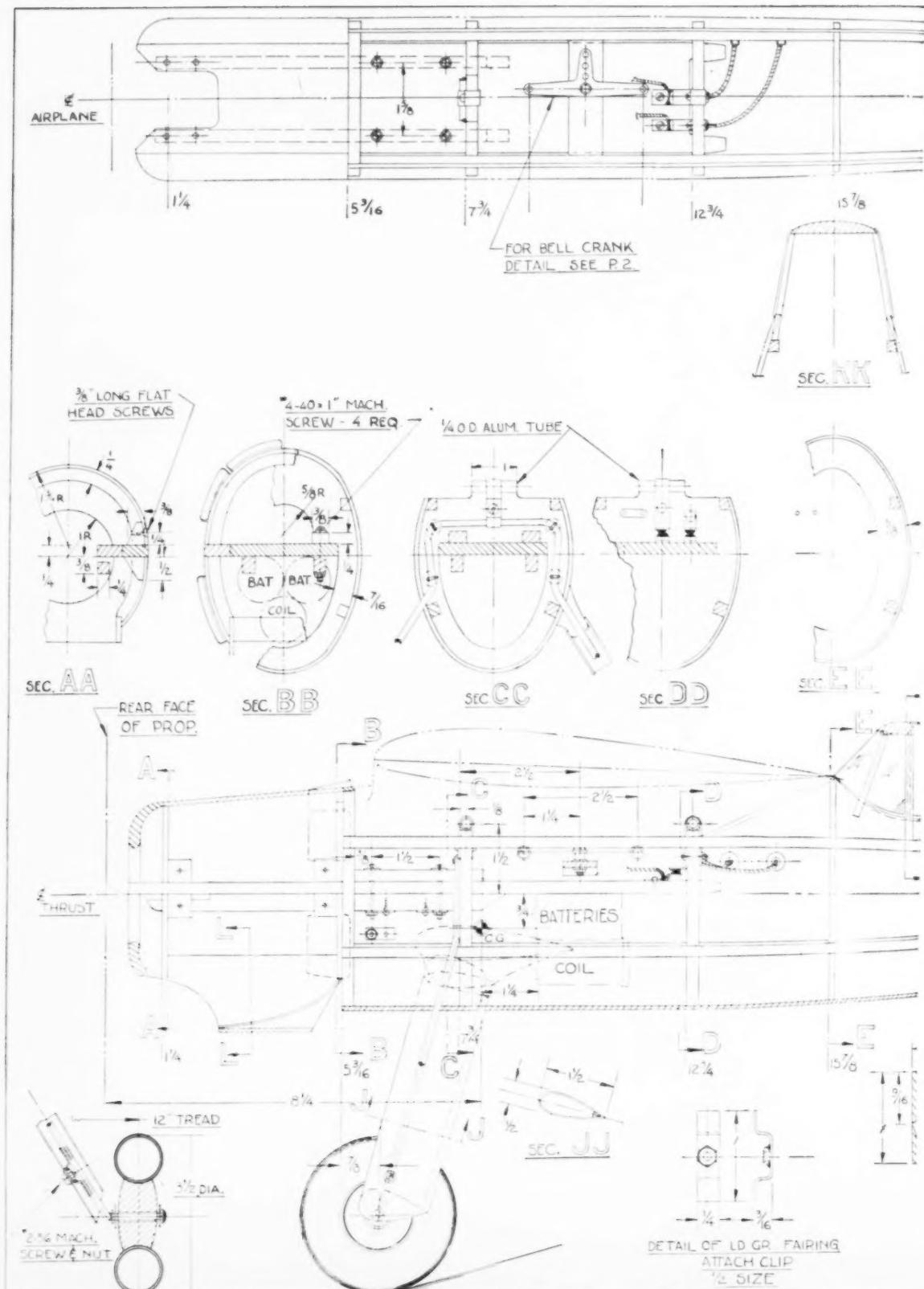
gas seeping into the wood and softening it. If you care to, you may paint the engine mount gray or silver. It should be noted here that the cowling attach blocks are not added at this time. They will be put on later.

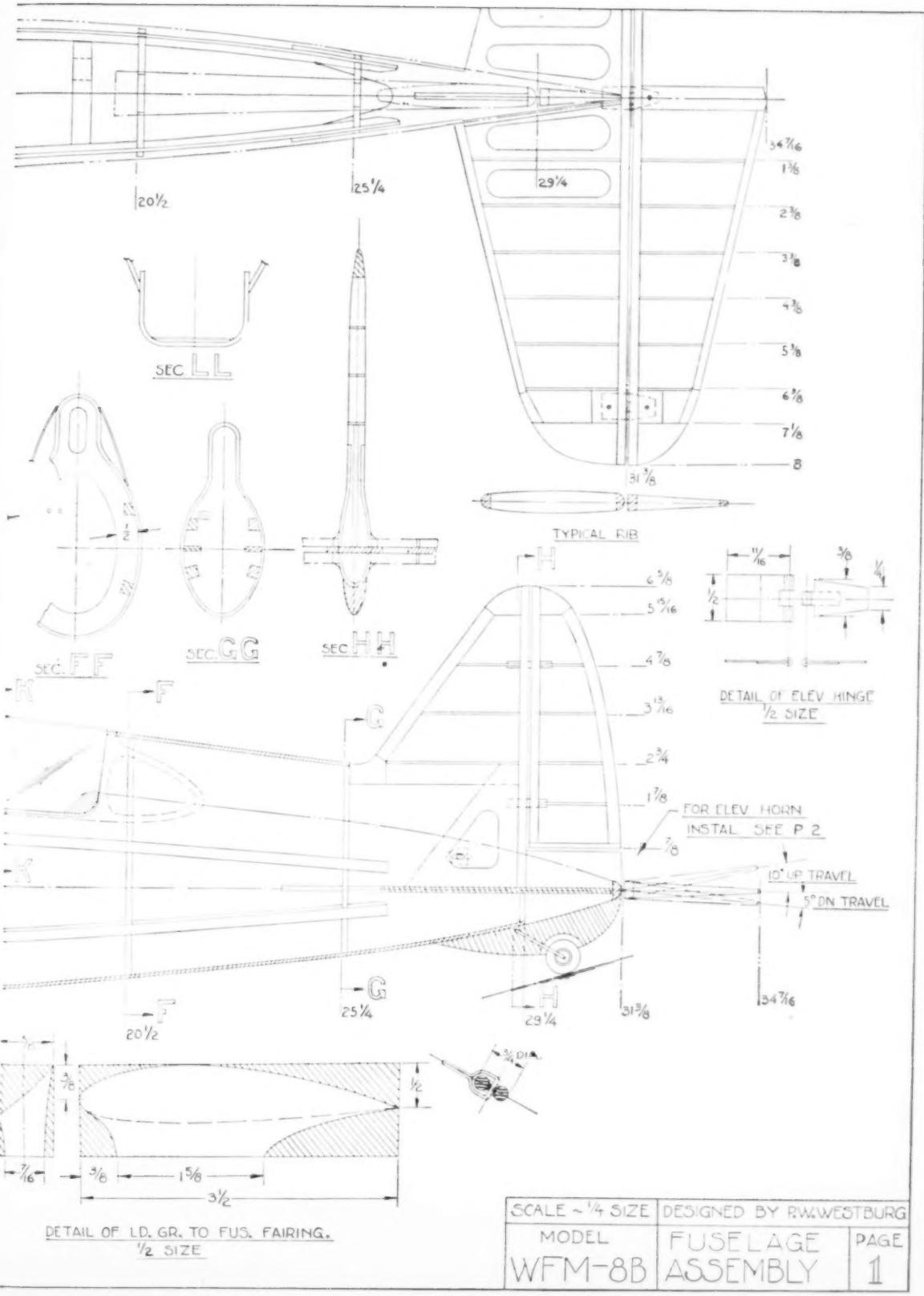
The four anchor nuts shown will save much time and will prevent fumbling for dropped nuts and washers. Each consists of a brass strip 1/4 x 5/8 and a 4-40 nut soldered on one end in which a 1/8 diameter hole is drilled. A hole is also drilled for a 3/8 round-head wood screw in the opposite end.

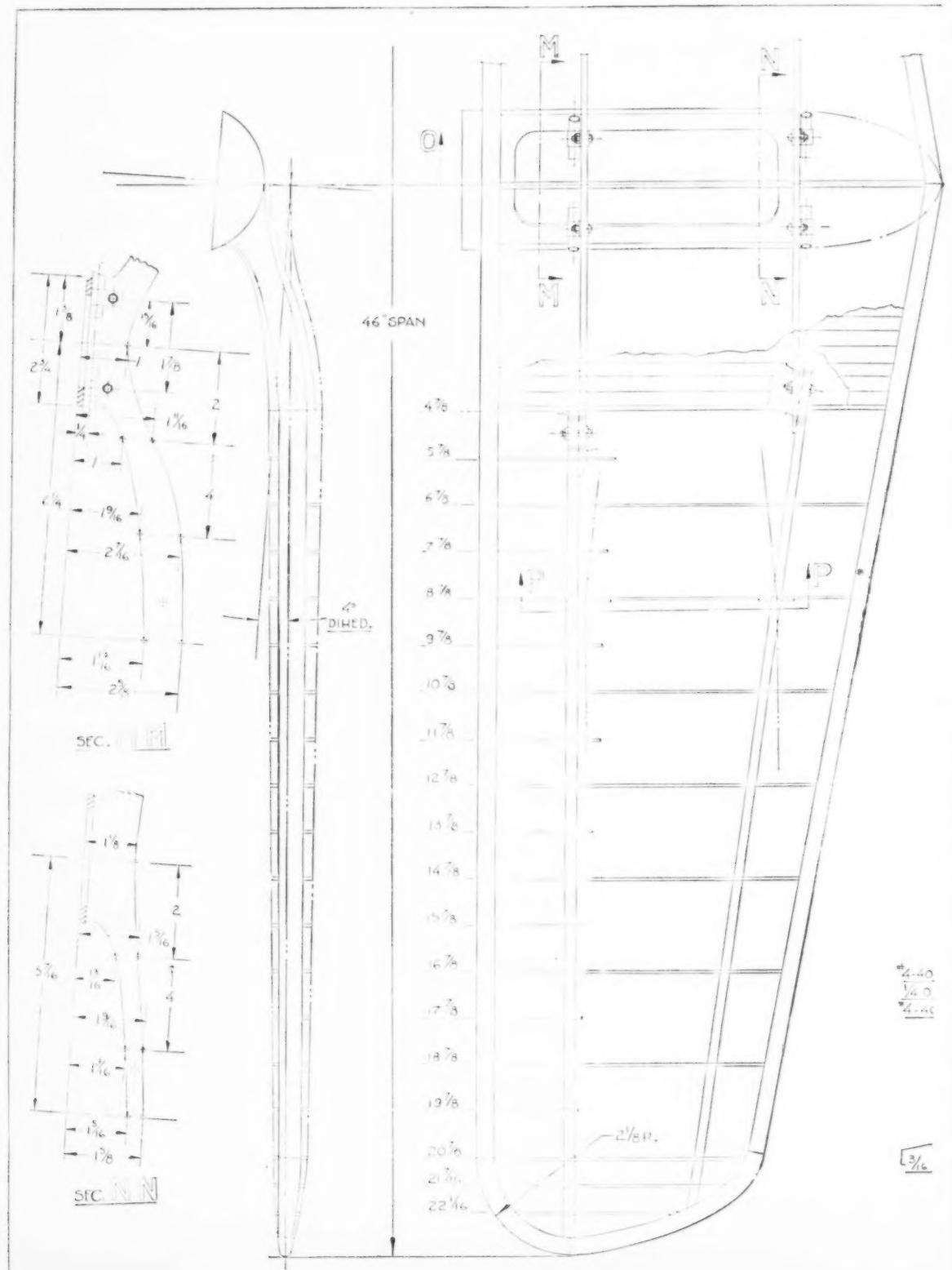
Fuselage: The fuselage is of conventional longeron and bulkhead (or former) construction, and in the original model, was planked with 1/8 x 3/8 medium hard balsa strips. In making all the bulkheads, use a scroll or coping saw to contour the parts and sandpaper wrapped around a dowel or tube for the inside curves. Make all the square cornered cuts and holes with a file. All of the bulkheads were made of 1/4" thick plywood for the first two, and hard balsa for the remainder. However, soft pine may be used as well. The longerons should be of spruce and are 1/4 square.

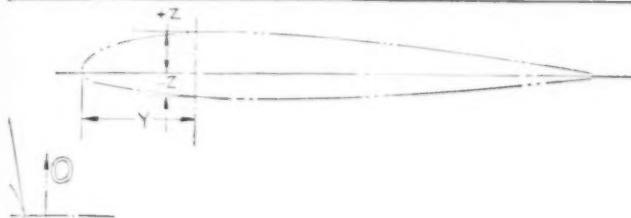
Sta. 5-3/16 bulkhead is made first, and is shown as the left side bulkhead in Sect. B-B. Note in this and Sta. 7-3/4 bulkhead, the clearance that must be maintained for the battery and coil assembly which comes out with the rest of the power plant. Sta. 7-3/4 bulkhead, is made next, and to it is added the 1/4 O.D. aluminum shear pin tube and the 1/8 O.D. music wire landing gear. The landing gear wire is bent as shown, and should be carefully checked for trend, and especially for leg length to make sure we do not have a "lop-sided" airplane. Use heavy pliers, and if necessary, heat the wire to a cherry red to aid in bending. At this point, we may add the fairing attach clip and inside washer which are both soldered to the wire. The fairing attach clip is shown detailed one-half size. It consists of a brass strip, and a 2-56 nut. After soldering to the landing gear wire, wrap it with tinned wire and flow solder all around.

Notice that a brass clip does double duty here in attaching the tube and landing gear wire. A 4-40 machine screw and nut is used to fasten the two parts
(Continued on page 38)



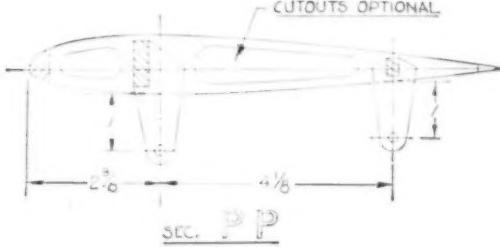




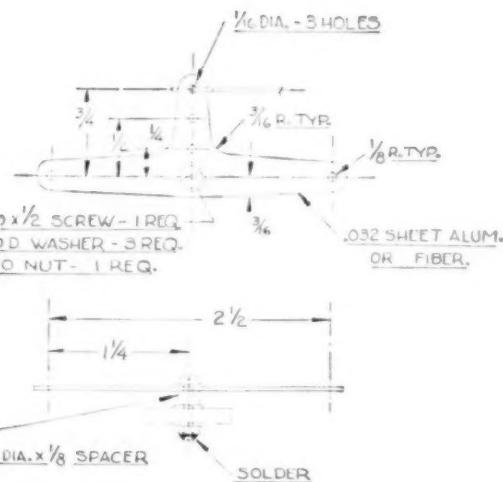


SEC. O O

CUTOUTS OPTIONAL



SEC. P P



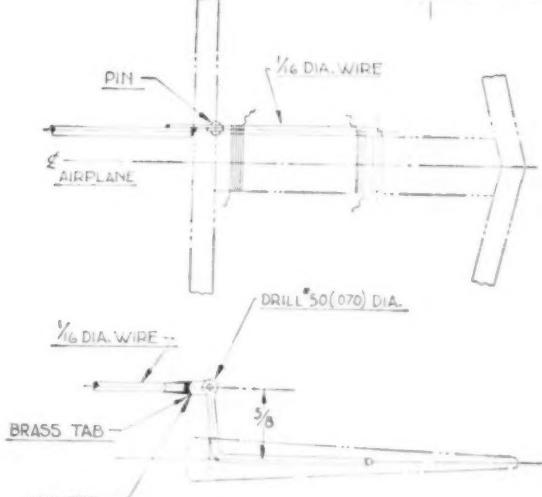
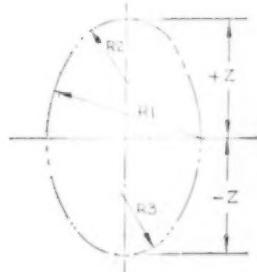
BELL CRANK DETAILS
1/2 SIZE.

%	STA	R1	R2	R3	+Z	-Z	+Z	-Z
125	Y	-Z	+Z	Y	-Z	+Z	Y	-Z
125	114	112	.244	.078	.077	.167		
25	215	156	.329	156	107	.225		
50	456	206	.440	313	.141	.307		
75	684	238	.529	469	.163	.362		
10	913	266	.587	625	.182	.402		
15	1369	319	.656	.938	.219	.449		
20	1875	362	.684	1250	.248	.469		
25	2281	390	.693	1563	.267	.475		
30	2737	407	.689	1875	.279	.472		
40	3450	408	.672	2500	.280	.446		
50	4563	380	.585	4125	.261	.400		
60	5475	335	.499	3750	.229	.347		
70	6387	274	.398	4375	.188	.272		
80	7300	197	.281	5000	.135	.192		
90	8213	112	.153	5255	.077	.105		

TABLE OF RIB OFFSETS

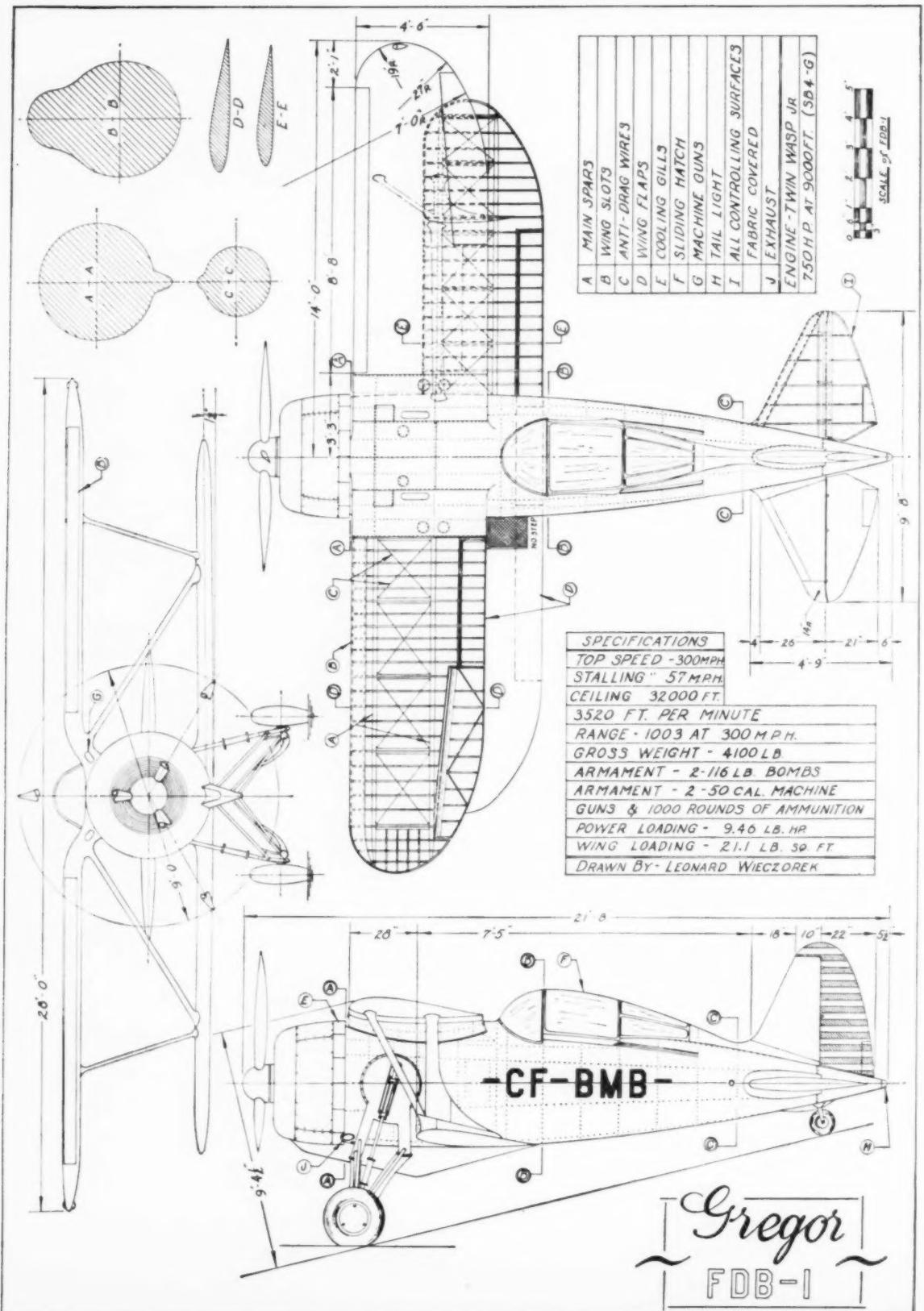
STA	R1	R2	R3	+Z	-Z
5 3/4	3500	1625	1675	2312	2562
7 1/4	3500	—	1625	—	2562
12 1/4	3500	—	1625	—	2562
15 1/8	3375	1250	1500	2562	2375
20 1/2	2875	—	1062	—	2000
25 1/4	1875	—	502	—	1500

TABLE OF FUS. OFFSETS



ELEV. HORN INSTALLATION
1/2 SIZE.

SCALE - 1/4 SIZE	DESIGNED BY P.WESTBURG
MODEL	WING ASSEM. & CONTROLS
WFM-8B	PAGE 2



ADVISORY BOARD

Answers to model design questions by our readers

USUALLY the more knowledge we acquire, the more questions arise, with each grain of knowledge gained, curiosity increases. This is especially true of young aviation enthusiasts: they are intrigued by its mystery and search for aviation information as eagerly as some old prospector for gold.

Many questions on all phases of aviation have come to the office of MODEL AIRPLANE NEWS. Following are a number of very interesting ones.

W. E. Watson, Jr., of Due West, S.C., is interested in retractable landing gears:

Question: Is there any possible way to rig up a retractable landing gear that will work in flight for a control line or free flight model?

Answer: Yes, there certainly is. Landing gear can be retracted any time during a flight by means of a timer, either in a control line or free flight model. Briefly, the method is as follows:

Solder a straight wire to the arm of a plunger type timer, so that when the plunger is pulled outward the end of this wire passes through a hole in a fixed metal or wood plate perpendicular to it. The landing gear to be retracted should be hinged with a rubber band fastened to it and to the fuselage, so its tension holds the landing gear in the retracted position. A second rubber band should be fastened also to the landing gear, pulling in the opposite direction from the first. Thus when tension is applied to the second band, the landing gear will move to the down position. On the end of the second band fasten a small ring or metal plate with a hole in the center. Slip this plate or ring over the end of the wire attached to the timer. At the take-off the landing gear will be down and then as the timer plunger moves inward, the end of the straight wire will be pulled through the hole in the vertical plate until it disengages the ring fastened to the rubber band. When this second band is released, the first band contracts, pulling the landing gear upward.

With proper arrangement of timer and tension on the bands, the landing gear may be made to operate in any desired manner and at any time during a flight. It may even be made to drop down to the landing position at the end of the flight by attaching one more band to it so that the third band will pull it down again when band one is released. Of course additional but similar arrangement will be required for releasing band one at the proper time.

Each band must have a different tension, inversely proportionally to the order in which they operate. For instance, band one will have the greatest tension; band two less and band three still less.

Question: Watson also wishes to know whether we can give any information on adapting low wing scale models for free

flight—for instance, the Bell Airacobra.

Answer: When scale models are powered with gas engines located in the same position as in large craft, few aerodynamic changes are necessary in most types of models. However, the Bell Airacobra is a close-hauled and comparatively unstable ship longitudinally, so in order to secure sufficient inherent longitudinal stability, the tail surfaces must be enlarged.

The stabilizer should be 25% of the wing area, the fin about 6%. Also wing dihedral should be increased to about 10°, a wing tip rise of 1" for every foot of wing span. If the span is 36" each tip must be raised 3" above the wing center point. It is also advisable to place the wheels slightly more forward than on the full scale ship. This will provide quicker take-offs and will tend to prevent nosing over when landing. These proportions hold true for nearly all gas models.

If the tail moment arm is unusually short the tail areas can be increased even more than mentioned here—for instance, stabilizer 30% of the wing area and fin 7-1/2%. When the moment arm is long as in the case of the British Spitfire, they may be reduced slightly.

In scale rubber powered models these proportions must be changed considerably. Stabilizer area should be at least 33% of the wing area and fin area not less than 10%. This is required because the weight of the rubber motor is not concentrated but rather distributed from front to rear of the fuselage. This increases the moments of inertia around the center of gravity and it is therefore more difficult to achieve recovery by action of the tail surfaces. Consequently, these surfaces must be larger to overcome this greater disturbing force.

Another factor enters the problem also, especially where the nose of the model is long compared to the tail moment arm, namely the gyroscopic effect of the propeller. When the propeller is far from the center of gravity at the end of the long nose, this effect is increased. It is also proportional to the size of the propeller which in models is usually of larger scale than in full scale craft. This gyroscopic effect occurs when the model circles, particularly to the right, and tends to swing the tail toward the left and upward, thereby causing a right hand spiral dive. A certain percentage of the stabilizer and fin area must be allocated to compensate for this propeller effect. This explains why rubber powered craft require more tail area than gliders which have no propellers.

Question: Watson also wants to know if it is possible to build a successful model pusher. I understand that stability is a problem here. How should the units of the plane be arranged?

Answer: Mr. Watson does not make it

clear whether he refers to a single wing acroplane with tail at the rear, equipped with a pusher propeller, or whether he is thinking of a plane of the so-called twin pusher type.

In the first case the plane is designed in a manner similar to normal tractors. No changes in the proportions are required. However, twin pushers require an original and an entirely different arrangement. In this type of ship the small wing is in front. It is of the lifting type and has an area of about 1/3 the main or rear wing. The front wing should be set at about 2° to 3° angle of incidence and the rear wing at zero. This angle is measured relative to the top of the frame sticks because the motors run parallel to them. The most important point concerning the Canard pusher models is the location of the center of gravity. This should be located at a point ahead of the main wing, a distance of 25% of the distance between the two wing centers. Incidentally, failure to recognize this fact by large aircraft designers has retarded the development of full scale Canard pusher craft considerably.

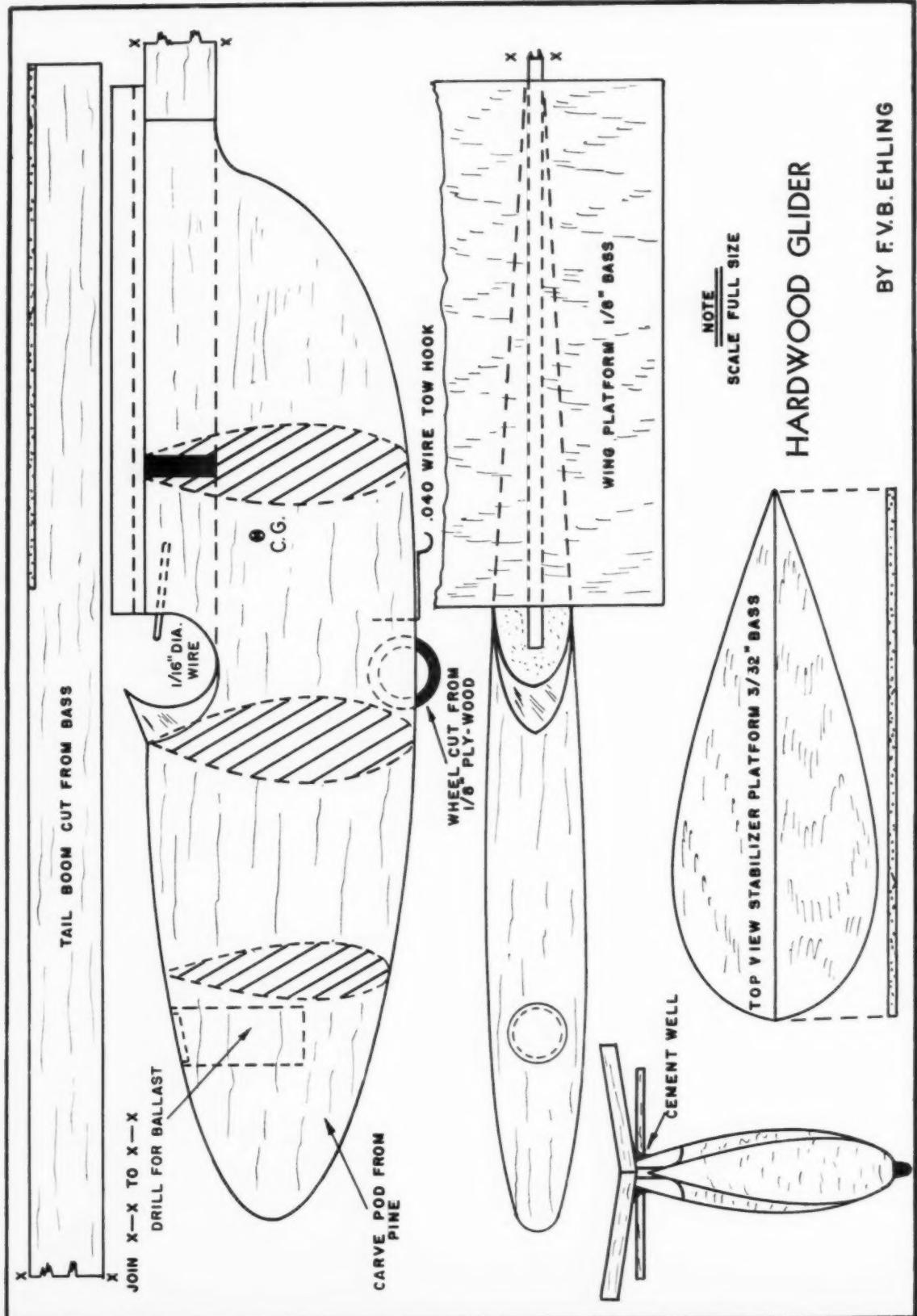
Mr. Albert W. Haley, Jr., writes concerning a towline glider he has designed, built, and flown. He says its behavior is very puzzling. It is a "pod" and "boom" design with very high aspect ratio wing. The stabilizer also is of high aspect ratio with a Clark "Y" section set at minus 4°. When first completed it was equipped with a Davis airfoil but with this it did not have a very flat gliding angle. However, it did fly, demonstrating a fair amount of stability on the towline and off. When the wing section was changed to a Grant M-7 with the center of gravity in the same relative position as with the Davis section (1/2 the chord back from the leading edge) it had a decided tendency to nose down even though it balanced tail heavy.

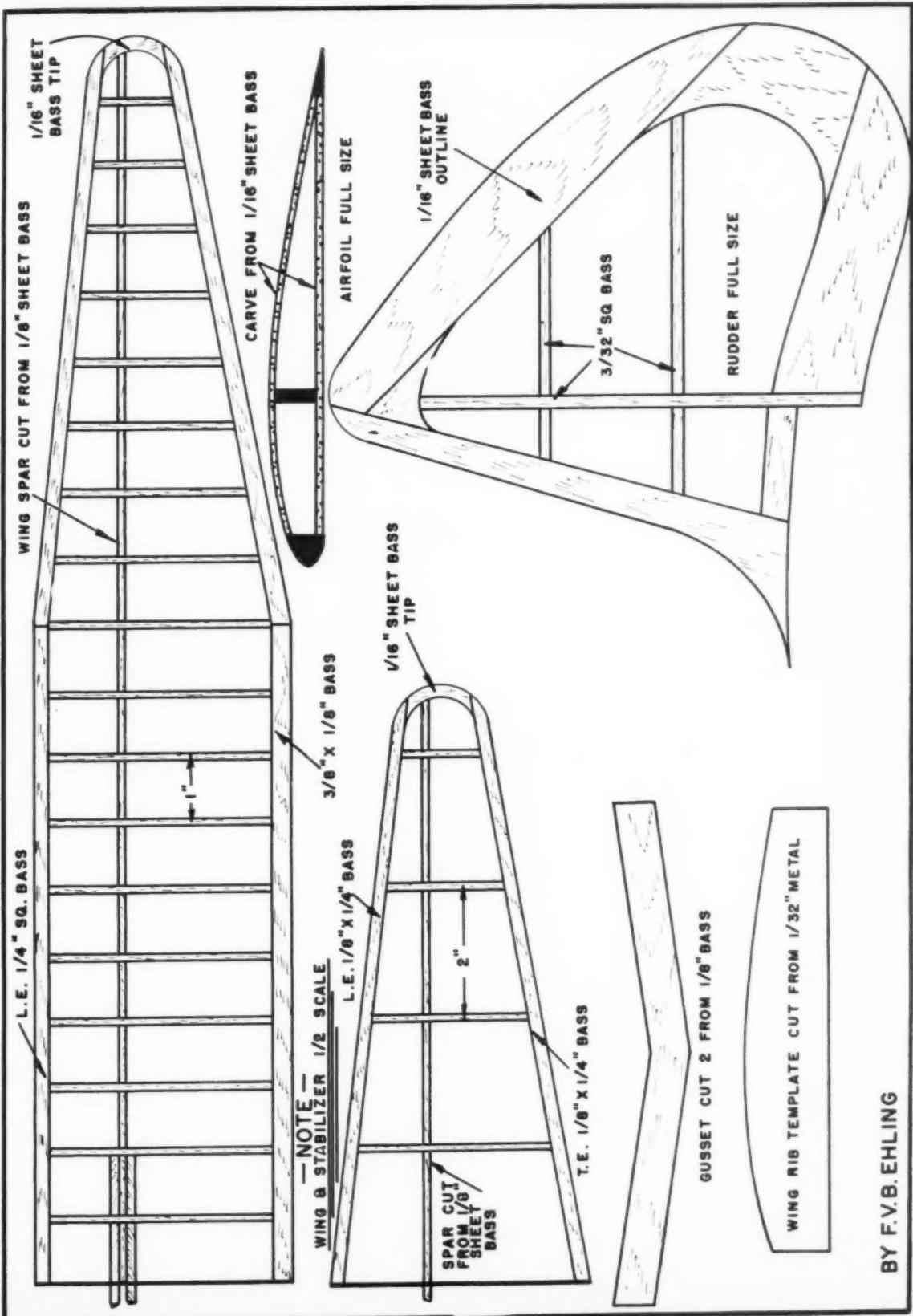
Question: What is the cause of this?

Answer: It is most difficult to diagnose the cause of such a flight condition from a general description of the airplane which might embody an omission or an incorrect value for some particular part of the structure. However, if Mr. Haley has given the complete story, there is only one answer and that is that the center of lift of the Grant M-7 is further to the rear than the C.L. of the Davis section. It appears that the Davis center of lift is further forward than on most sections.

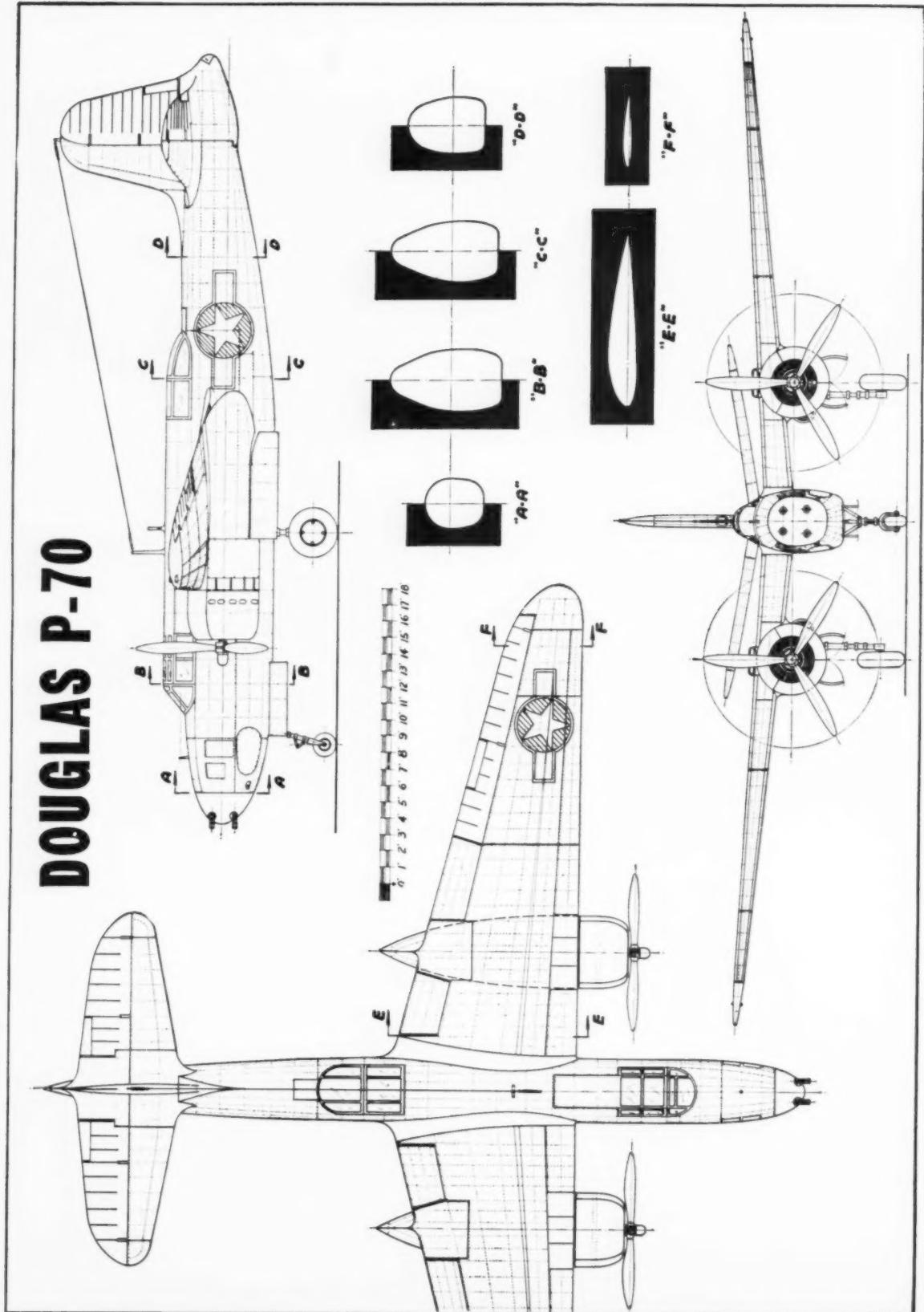
To correct the nosing down tendency, move the Grant M-7 wing forward slightly until proper flight balance is attained. If this is difficult to do for structural reasons, we suggest setting the stabilizer at minus 5° or minus 6°. We assume in this case that this stabilizer setting is measured relative to the wing

(Continued on page 36)

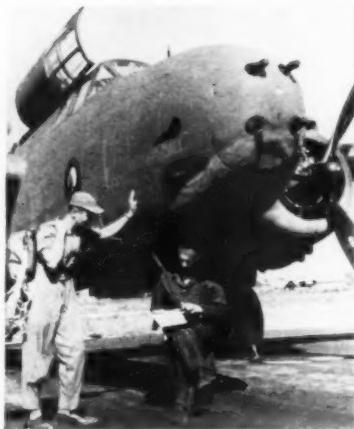




DOUGLAS P-70



DOUGLAS P-70

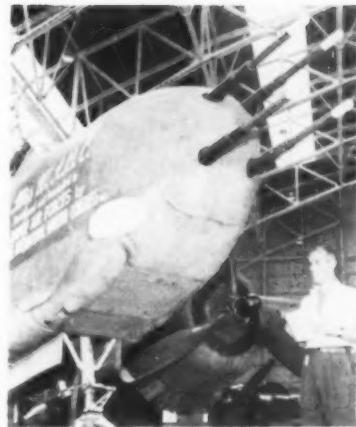


Two versions of the P-70 have appeared, this picture showing the type mounting six .50 caliber machine guns in the nose. The other two guns are within the fuselage.

Plane on the cover

"EASILY the outstanding general purpose airplane of this war" is the unanimous opinion of the Allied Nations, from mechanics, pilots and generals, of the Douglas model DB-7 in all its endless variations. It has seen action in every combat theater and has been used in every possible tactical employment. It figured largely in the success of the North African campaign from the very start of the offensive at Matruh in Egypt to the culmination at Tunis in Tunisia. It attacked the Germans on Sicily and followed them into Italy at Salerno. It has been used in New Guinea and China, in Russia and India, in the West Indies and Aleutians. It has seen service as a bomber, a fighter, an attack plane and a photographic reconnaissance machine. Few airplanes equal its versatility; none its all-round performance and sheer combat power.

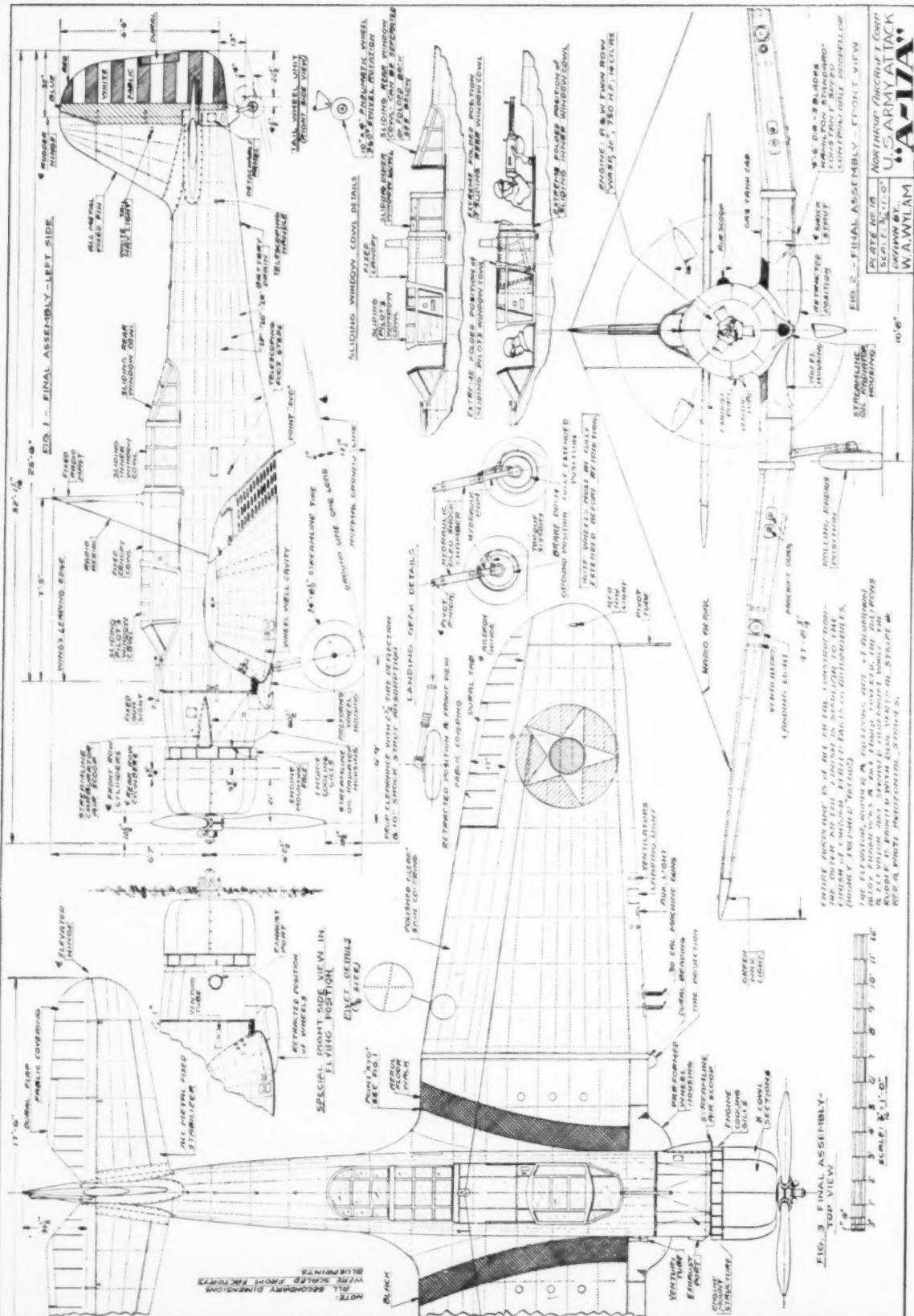
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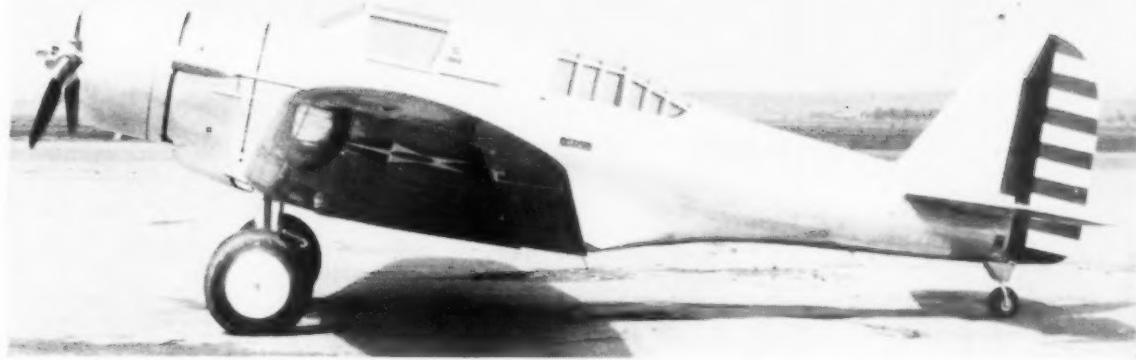


This is the cannon equipped version of the P-70. Picture shows four 20 MM barrels protruding from nose. Two .50 caliber machine guns are also carried in position behind white patch.



The original Model 7 bomber taxiing towards the take-off point. It crashed and burned.





NORTHROP A-17A

**Detail layout scale plans for
this famous Army attack plane**

by WILLIAM A. WYLAN

THE Northrop A-17A is the latest attack plane of a series commenced with the formation of the Northrop Corporation at El Segundo, California in 1932. Previously the Northrop interests in Burbank had been absorbed by Lloyd Stearman which, had in turn, become a part of United Aircraft Corporation. The Northrop A-13 appeared in 1933 and the A-16, a further improvement, in 1934. The A-17 was produced in 1935 and quantity orders were filled for the (then) Army Air Corps. The A-17A was a refinement featuring a fully retractable landing gear and more than a hundred were built for the Army.

The Northrop attack planes were conceived around Mr. John K. Northrop's multi-cellular type of wing construction which consisted of a honeycomb arrangement of ribs, spars, intercostals and baffles. Although of greater strength /weight efficiency than previous types

of wing structure, the multi-cellular type presented difficulties in the installation of items within the wing. This resulted in the use of large formed pans placed forward of the wing-fuselage joint into which the wheels were folded.

The A-17A is powered by a single Pratt & Whitney "Twin Wasp Junior" Model 1 SB4-G engine, a 14-cylinder double row, radial, air-cooled type developing 825 horsepower for take-off at 2625 rpm, 750 horsepower for normal continuous use and 525 horsepower at 2550 cruising rpm.

The A-17A has a wing span of 47 feet 8 3/4 inches and is 32 feet 1 inch in overall length. It has an empty weight of 4875 pounds and weighs 7440 pounds fully loaded.

Armament consists of four machine-guns located in pairs in each outer wing panel and a single movable machine-gun located in the gunner's compartment.

The A-17A has a top speed of 220 miles per hour and cruises at more than 180 miles per hour. Many of them are still in use for special headquarters transportation work and several are used by high-ranking officers of the Air Forces for their personal transport.

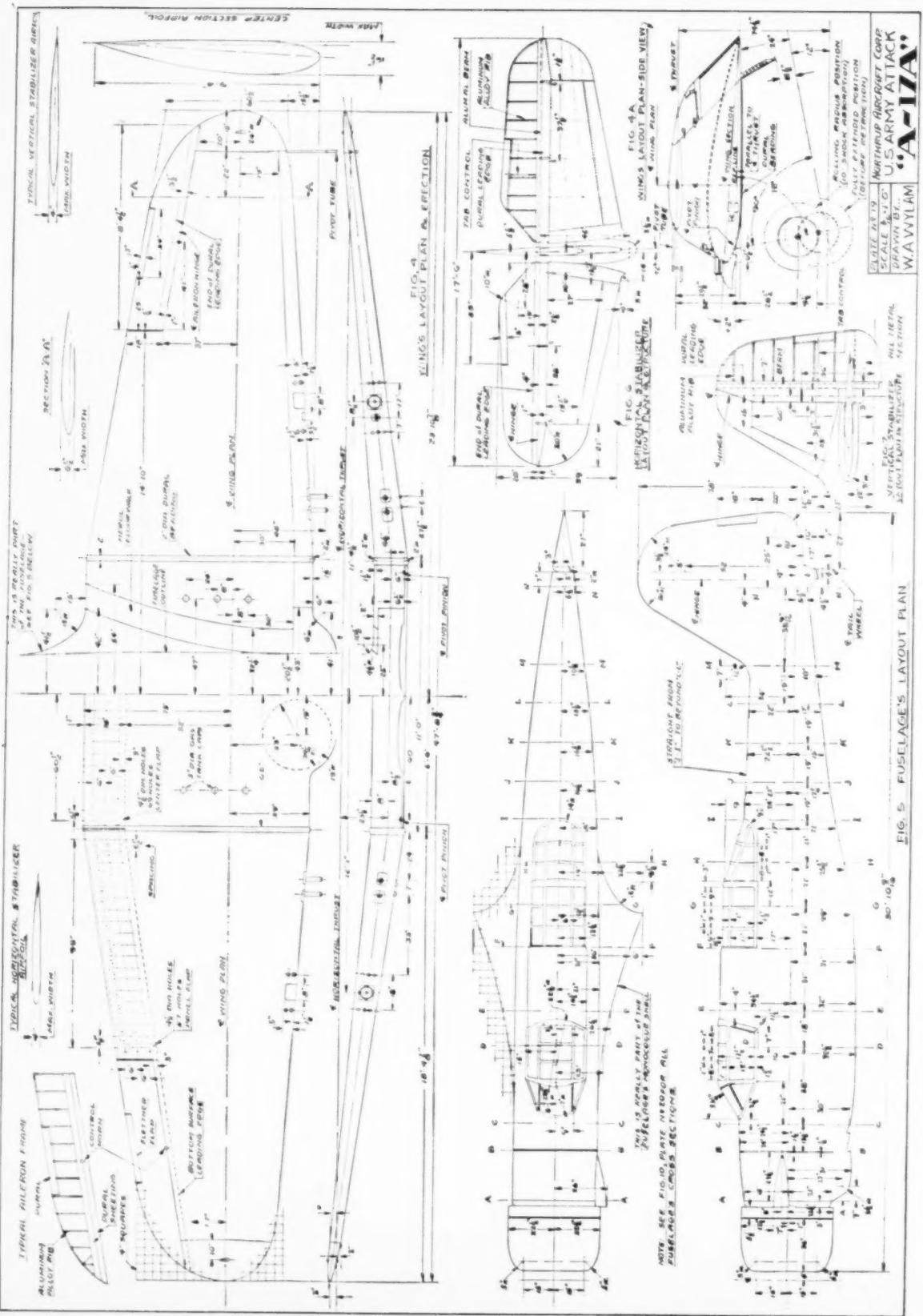
The Northrop firm was absorbed into Douglas Aircraft where it became known as the El Segundo division of the firm. There, under the designation of Model 8, the Northrop attack machine was exported in quantity to several foreign governments including Argentina (Model 8A-Z), Sweden (Model 8A-1), Peru (Model 8A-3) and others. One was purchased by the Royal Air Force for experimental power plant test work and a modification of the type is now in use by the Navy and Marine Corps as the Northrop BT-1. This same design resulted in the renowned Douglas SBD-1 "Dauntless" which gained fame in the Southwest Pacific as a dive-bomber.

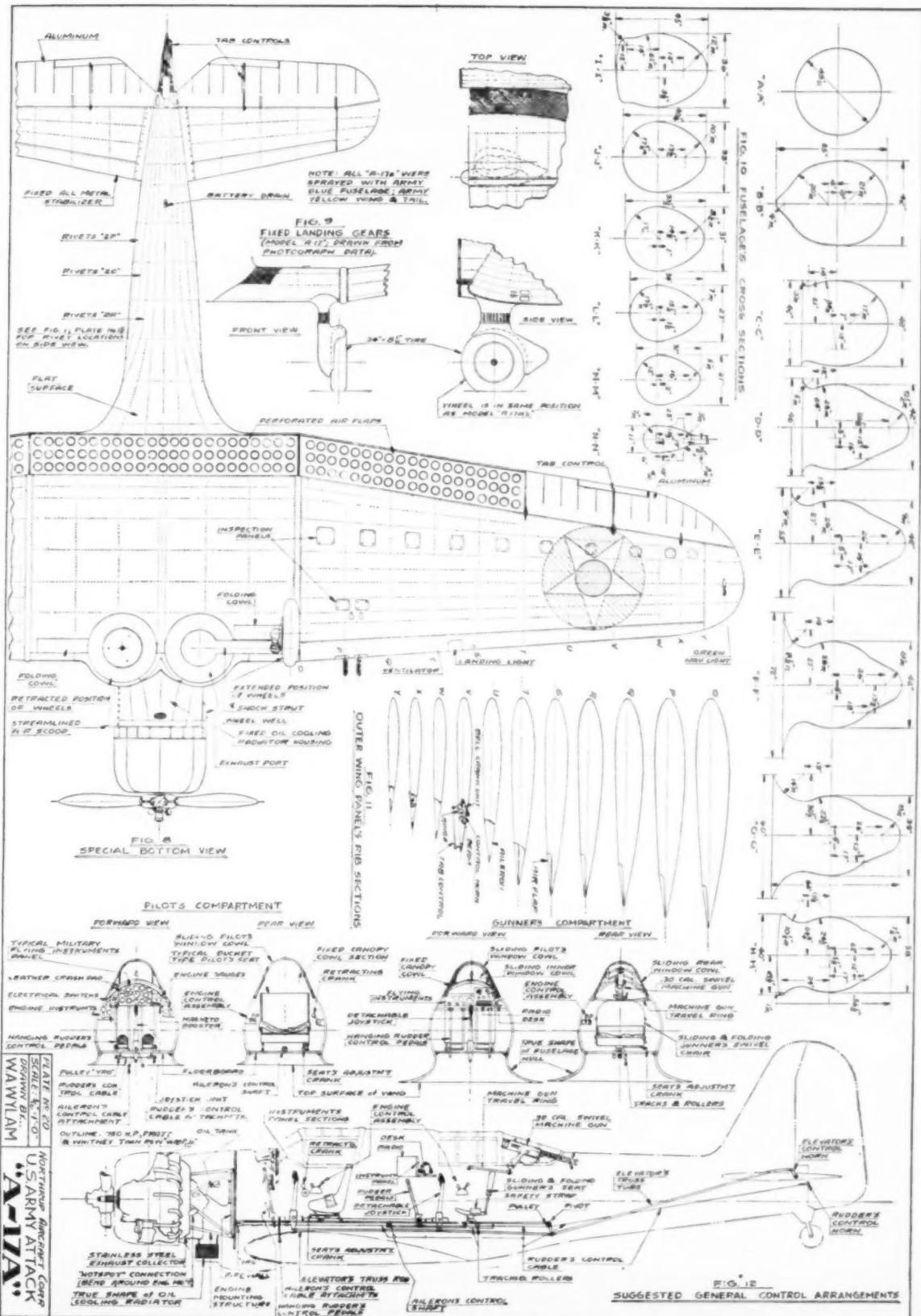
Some Model Building Suggestions

The fuselage is of a bright metal finish called "Alcad" and this effect is very hard to get on scale models unless you employ some novel method to get the finish. Some modelers have had luck in

(Continued on page 60)









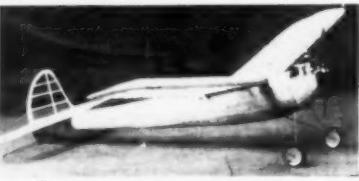
1. Evans' Vought Fighter



2. Thunderbolt by W. Leske



3. An original by Joe Simmons



4. A gas job from Australia



5. Twin engine Martin Marauder



6. John Adams' modified job



News of model plane experimenters from all parts of the world

IN PRESENTING *Air Ways* each month and the selection of pictures of new developments in the field of model aeronautics, we receive frequent inquiries concerning a particular plane. These are always mailed on to the designer and builder of the plane. However, it is not unusual to receive a large amount of correspondence asking whether or not plans for building certain planes illustrated in this column are available. When we receive enough of this type of mail, we frequently write to the builder requesting him to draw up the plans and prepare an illustrated article for presentation as a feature in the magazine. Many times this is the real story behind the presentation of articles dealing with the construction of a model.

If you are particularly interested in any of the planes shown this month, or in any issue, please let us hear from you and if the number of letters warrants, we will arrange for the presentation of detail plans and construction information.

For those of you who feel that your design merits publication, by all means send them in. We are, at all times, anxious to receive submissions of material and will always cooperate in giving every possible consideration to plans that are well presented for a design of proved abilities. The drawing of detail plans and preparation of construction articles is as absorbing a hobby as building the model; and payment will normally pay for the materials used in the model many times over.

There is no mystery or secret to the preparation of material for publication. If you are in doubt about the best way to go about it, our only advice is to study the drawings, photographs and articles in any issue and prepare yours accordingly. The size of drawings or photographs is of no consequence so long as drawings are in the correct proportion and photographs are clear, sharp and large. May we suggest that you put your ideas on paper and

let us have a look at them? You may be launched on a new career with much greater ease than you had expected.

The picture adorning the head of Air Ways this month shows W. L. (Billy) Evans of 1201 Elmwood Ave., Fort Worth 3, Texas, and his gas model powered by a Baby Cyclone motor. Billy also sends in Picture 1 of his Vought Fighter which is posed in a striking resemblance to a famous photograph of this ship when it was known as the Northrop Fighter. Billy writes he is a member of the recently formed Aircraft Modelers Club of Fort Worth which is presided over by Sgt. Raymond Matthews, who is an instructor at the Fort Worth Army Air Field. There's nothing so valuable as a trained, experienced man to guide a model club and it would appear that the Fort Worth gang has such a man.

In September, the club held a statewide contest under the auspices of the City Recreation Department which was managed by its superintendent, Mr. R. D. Evans. There were 70 entries and first place prizes went to the following: Class A Endurance, Mrs. V. W. Russell of Fort Worth; Class B Endurance, George Tucker of Dallas and Class C Endurance, Don Curry of Dallas. Mrs. Raymond Matthews, wife of the club president, won the Senior Rubber-Powered Event and the Junior Class was won by Eugene Fowlkes of Fort Worth. The Tow-Line Glider Contest was won by Keith Washburn, also of Fort Worth. Tex Russel took first place in both the A and B Control-Line Contest, his model being clocked at 85 mph. More than \$100 in prizes were awarded.

Willmar Leske of Aberdeen, South Dakota is responsible for Picture 2 showing his beautiful control-line Republic Thunderbolt. He says:

"Personally I don't go much for those freak control-line racers without landing gears or wings. A scale ship looks like an airplane and it can be flown, stunted

and then landed nicely on its wheels and fly again with the same prop next flight. That's my idea of a thrill!"

We think there's a lot of modelers that will agree with you on that.

Picture 3 comes from Joseph R. Simmons of 7326 Hooper Ave., Los Angeles, Calif., and shows his original Hot Rod which supposedly answers some problems. Joe states:

"When the gas and tires went so did the contest model so I designed a go-up-fast come-down-fast model that would require no auto to retrieve it."

This is at least one practical solution to wartime restrictions. The plane has a 200 square inch wing with a span of 33-1/2" and is powered with a Madewell. Joe says he gets from 5 to 7 min. out of it every time on a 30 sec. motor run.

Picture 4 has covered considerable distance since it was taken for it comes from Charles H. Tuckery of 71 Raymond Street, Victoria, Australia. He states his model has made about 300 flights and is still going strong. For those of us who are curious about model conditions in Australia, Charles writes:

"We do not have to worry about a timer as we just let them go as high as they like with no petrol restrictions. My opinion is that a restricted time of flight spoils the game as a plane that climbs like a rocket and has a bad glide is no fun. We like a plane that climbs like a real plane and it is far more interesting to watch. I like a plane that takes 4 minutes to climb to 1000 feet. As to thermals, they are not bad here except in a very hot, dry summer. If the grass is green we get no thermals to speak of."

Charles' plane has a span of 7 ft. 6 in. and is 56 in. long. The fuselage is all planked and he adds: "She is very stable fore and aft and has a glide like a parachute."

John S. Dennis sends in Picture 5 of his Martin B-26 Marauder which is powered by two Atoms. Built in collaboration with Duncan Gray, the ship is a control-line but has not yet been flown. We have never heard of a completely successful twin-engine gas model due to the difficulty of getting both engines to run at the same speed. Unless this is done there's



7. Flyingboat Neptune gas job by Robert J. McCaddin of Baltimore

apt to be some trouble. John, who lives at 209 Sunset Ave., Asbury Park, New Jersey, might let us know how he makes out. Those of you who are interested in this experiment, drop John a line. It's going to be something interesting to watch. By the way, that's something for you fellows to work on, a model engine synchronizer.

Picture 6 shows the work of John Adams, 1520 E. Broward Blvd., Ft. Lauderdale, Florida. The two wheel landing gear was substituted and a single sub rudder replaced the twin ones originally used. Powered by an Ohlsson 19, and an 11 in. prop, the plane averages flights of about 2 minutes.

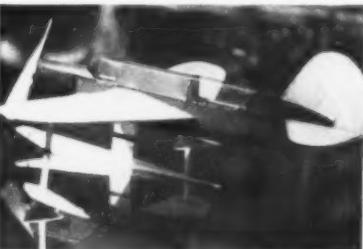
A very remarkable job has been turned in by Robert J. McCaddin of 3400 Ramona Avenue, Baltimore 13, Maryland, on his Neptune shown in Picture No. 7. This beautiful craft is powered by a Forster 29 but Bob says he has had very little success with it, the plane swinging in circles about one float instead of taking off. This fault might be due to the fact that the float supports are not long enough. This causes the low wing to be too far off balance by the time the float touches, causing the float to dig in. By lengthening both of the float supports, this will put both of them very close to the water and they will level the wing much faster. Both floats should have larger planning areas. Bob says that he is going to try sponsons



8. Douglas Dauntless scale model



9. Art Senn's Wyoming 20 min. flier



10. Curtiss from Santiago, Chile



11. Beautiful Taylorcraft by J. S. Luck is example of excellent photography and construction

Sensational New
OTT-O-TUBE
Construction

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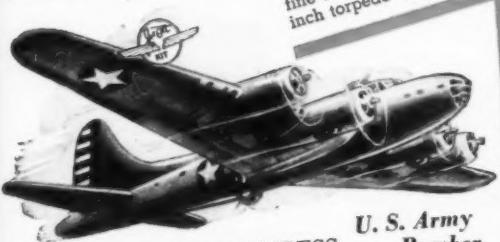
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of their practical knowledge they work a formula.

So it is impossible to truthfully state any one definite form of attack with just one exception; any night fighter going in to the kill at close quarters, and by close quarters is meant approximately fifty yards, will adopt a weaving approach. A fighter pilot uses both aileron and rudder in his method of attack, thereby always keeping the bubble in his turn and bank centralized in order that when he straightens out to give his first burst he will be on a level keel, whereas a bomber diving through flak will employ rudder with opposite aileron thereby setting up a skidding motion which not only throws the accuracy of the anti-aircraft guns off their calculations but decreases his altitude at every skid.

A night fighter does not want to lose altitude, therefore he does a normal weaving motion using the ailerons so that he maintains constant altitude until ready to close in for the kill.

So in order to show the difference in tactics we can take the Lightning and the Spitfire. The Lightning is at her best in a long shallow sweeping pass, for the P-38 needs plenty of 'elbow room.' The night raider gives its position away by the orange blue flames of the exhausts, and the fire from its guns. So with the Lightning diving at over 500 m.p.h., the pilot has to use split-hair judgment on holding his fire to the last fraction of time, then a devastating burst with a quick passing climb to either port or starboard. Now the Spitfire being a single engine highly maneuverable fighter with a practically vertical climb, the pilot prefers to attack from underneath with only the under belly blaster to contend with.

Formation flying in attack is not encouraged. There is the risk of collision between friends when flying in the violet blue darkness. Now high altitude interception, whether it be on a cloudy night or a night free of all clouds is the same

thing, for between thirty-five and forty thousand feet there is no rain, no snow and no moisture. Therefore, there can be no icing conditions; but added to that, there are no particles of dust in the thin air which would lead to any diffusion of light from the moon and stars. Therefore, the higher the interception, the greater the accuracy, which of course is also applicable to the greater efficiency of the fire of the raider.

In 1939 an electric gunsight was installed on fighter aircraft which is an excellent device for day uses, but for night fighter work, owing to the orange suffused light on the windshield it is better to do a general aim with the inner ring and outer bead sight, and then allow for the tracers to give guidance for fractional correction.

So it can be readily seen that a night fighter pilot really has something to contend with. He has to fly by the seat of his pants, his vision and nerves must be perfect, for while sitting up aloft, or climbing to the attack, he also takes the chance of his own flak and then when he reaches his objective, he not only is searching through the 'upper-lightness' after the pitch black darkness he has left below, he has to see whether he can spot the enemy first or whether they get a good burst in at him.

Everything is regulated as far as possible. Immediately fighters converge on their target the searchlight beams go off to a large extent leaving one or two flickering stabs of light to guide the fighter to his target.

With present day armor-plated bombers and self-sealing tanks the night fighter pilot has to get in close so he can rip the engine on either port or starboard, or else give a cannon and machine gun blast into the wing root, to insure the bomber does not return home.

So the life of a night fighter pilot is not an easy one!

VICTORY

Aviation Advisory Board

(Continued from page 21)

chord. If you prefer to keep the stabilizer at minus 4° increase the wing angle 1° or 2°. The Grant M-7 is a high cambered section which requires a large angle of incidence—from 4° to 6°. Thinner sections require much less—2-1/2° to 3-1/2°.

Mr. Haley asks another very interesting question, as follows:

Question: All the plans for wind tunnels I have ever seen contain only balances for lift and drag. Are there any means for ascertaining the stability of any particular design?

Answer: No, not usually because the stability of a model is determined by the relative values of lift and drag and how they change with different flight angles. In other words, this is an abstract problem that must be calculated from lift and drag values obtained on the wind tunnel balances. For instance—if, with any degree of roll sideways the lift moves to the high side of the wing, it is ascertained immediately that the model is laterally unstable because the center of lift moving to the high side will increase the roll; if

it moves to the low side of the wing it will have a righting tendency.

Now suppose that the center of lift moves backward when the ship is in a diving attitude; it is known immediately that the dive will be increased and the ship is unstable. The position of the center of lift and drag is determined in the tunnel by suspending the model by two or more lift wires and a drag wire. Two wires may hold the model at the wing tips and a third wire may be fastened to the tail. Any movement of the center of lift forward or rearward will be recorded on the balance by a reduction or an increase in the tension of the tail wire. This principle applies to all other stability conditions which are obtained from static testing. Some tests are made in the free flight tunnel. In such a case the reactions of the model are observed as it moves downward through the tunnel nose first against the air stream passing upward.

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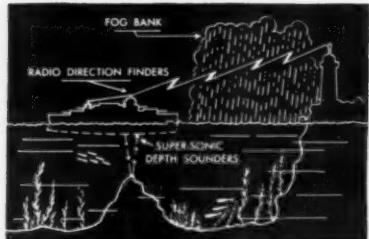
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bulkhead is bent at right angles, and a 2-56 machine screw and nut is used to hold it; the others assemble on the engine mount when the ignition wiring is done, and are joggled as shown. A large drop of solder on each clip acts as a contact point when the power plant assembly is pushed into place. This allows the booster plug attachment to be permanent, and permits their location in a convenient place on the fuselage. Check the fit of the engine mount into the proper holes and see that it comes out easily. There should be no necessity to bark or twist the engine mount out.

Using the engine mount as a jig, we assemble on it the bulkhead assembly, which we made some time ago, and Sta. 12-3/4 bulkhead. For this purpose, use 4-40 x 1" long machine screws. Add the four longerons and nail and glue them in firmly. This assembly should dry thoroughly—meanwhile we can busy ourselves with the remaining three bulkheads.

These three bulkheads are at Stations 15-7/8, 20-1/2 and 25-1/4, and are shown in Sections EE, FF, and GG respectively. Note the "ring thicknesses" which must be maintained for strength, and control rod clearance. Sta. 25-1/4 bulkhead is solid and has a cutout for the control rod and two slots for the horizontal tail surfaces stiffener.

We turn our attention now to the structure at the aft end of the fuselage. Let us consider first of all, the horizontal stiffener. It is made of 3/32 thick pine and its contour is shown clearly in the fuselage top view. The lightening holes should be put in since any weight removed here is to our advantage in balancing the model. The vertical stiffener is a simple triangular piece of 1/8 thick pine also. We may also make the vertical stabilizer spar at this time. It is shown in Sect. H-H. The spar is 3/16 x 3/8 except for the lower end which serves as a former. Note that there is a small former just below the horizontal stiffener. Make an assembly of stiffeners, spar, former, and Sta. 25-1/4 bulkhead. Check to make certain that the horizontal and vertical stiffeners make right angles with each other. Let this assembly dry thoroughly.

Now comes the ticklish task of assembling the longeron-bulkhead assembly, and the stiffener-spar-bulkhead assembly. Support the first assembly on its landing gear legs, and in a horizontally level position. Now support the tail section assembly its proper height above the ground line, and move it forward to a point where Sta. 25-1/4 bulkhead is exactly 12-1/4" aft of the rear face of Sta. 12-3/4 bulkhead. Using rubber bands or string, close up the longerons so that they will lie in the longeron cuts in Sta. 25-1/4 bulkhead. These should be a trifle over-size to permit assembly. Glue the longerons to the bulkhead with resin or casein glue and let dry at least overnight.

Sta. 15-7/8 bulkhead and Sta. 20-1/2 bulkhead may be added now. It may be a tight squeeze, but if the longeron cuts have been made oversize, they will go in satisfactorily. Cement these in firmly.

Returning to the forward portion of the fuselage, we now add the cowling formers to the engine mount. There are two upper and two lower formers as shown in Sections A-A and B-B. The inside contour should not be cut at this time, unless they are of pine. If balsa is used, they may be easily contoured after the cowling has been made. Note that they are $1/8$ thick; however, $3/32$ sheet pine may be used. Cement these formers very lightly to the engine mount, and Sta. 5-3/16 bulkhead. Next, add the short pieces of planking between Stations 1-1/4 and 5-3/16.

Continue the planking at this time by putting on as many long strips as are possible to put on between Stations 1-1/4 and 29-1/4. Remnants of the longer lengths may be used for the shorter runs, and small open sections may be filled in with scrap balsa blocks. If you have very little balsa, plank only the area between Sta. 5-3/16 and 7-3/4, and above the top longerons between Sta. 12-3/4 and 20-1/2. Elsewhere use stringers of $3/32$ square pine spaced $1/2$ " apart and cover with paper—or silk, if you are that fortunate.

As for material substitution in the cowling—well, I don't know. If you can't beg, borrow, or steal enough to plank it, you might try a frame work covered with stiff paper. It is also possible to make a cowling by wrapping layers of gauze around a form and using resin glue as a bonding agent. This is quite heavy, however, and is only mentioned as a substitute.

The upper and lower nose blocks must of necessity be made of soft or medium hard balsa. Trim these roughly to shape as one piece, and cut the $2\frac{1}{2}$ " diameter hole in the center. Split the block apart, and after trimming the planking ends from around Sta. 1-1/4, cement them lightly to the former here.

It is also necessary to build up the area between Sta. 29-1/4 and 31-3/8 with balsa blocks. Sand these down carefully—the upper block must have the same shape as rudder rib Sta. 7/8.

Using rough sandpaper, sand down the planking until the entire surface is unbroken by edges of planking, and finish the planking down to a minimum thickness of $1/16$ ". Coat the fuselage with dope and sand with fine sandpaper. Do this as many times as your idea of a good finish demands, but at least twice. If you're a "plutocrat" use silk to cover the planking and you will have an excellent surface. When all the little cracks and corners have been filled, trim the planking between Sta. 5-3/16 and Sta. 15-7/8, and above the top longerons. Make a slant cut from the top of Sta. 15-7/8 down to the longerons and the aft face of Sta. 12-3/4 bulkhead. Make a former to fit in this area and cement in place.

The cockpit structure consists of five pieces. There are four supports and a dome piece to lend some contour to the cockpit lines. The celluloid is not cemented on until the fuselage is painted.

At the intersection of the leading edge of the vertical stabilizer and the top line of the fuselage, add a small balsa block, but do not sand it to shape until the

(Continued on page 42)

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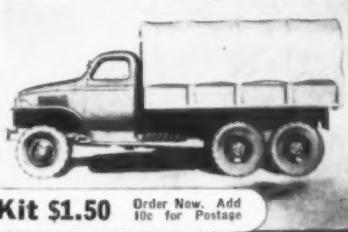
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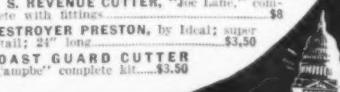
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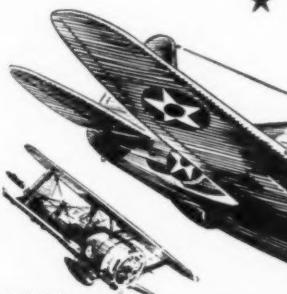


**Bell P-39
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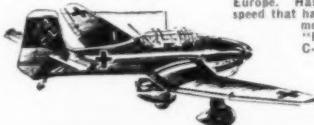
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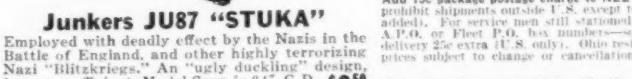
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later.

Remove the engine mount from the fuselage and complete the vertical and horizontal stabilizers. All ribs are of either 1/16 hard balsa or 1/20 pine, and are a maximum of 1/2" wide. The lengths may be determined by scaling the plans. The stabilizer leading edges are of 1/4" square hard balsa or pine and the horizontal stabilizer spar is 3/16 x 3/8 balsa or pine. The tips are small blocks of balsa sanded to shape after assembly. Note that on the horizontal stabilizer there is a 1/8" thick root rib and that this rib and Sta. 1-3/8 are split into two parts because of the horizontal stabilizer stiffener. Do not forget to add the pine blocks between Sta. 6-3/8 and Sta. 7-1/8. After the stabilizer assemblies have dried well, sand them to a streamline shape as shown in the typical rib view on Page 1 of the plans.

The rudder and elevators are made in much the same way as were the stabilizers. The trailing edges are 1/8 x 1/4 hard balsa or pine, and there is a center rib in the elevator which is 1/2" wide and must be of pine. The rudder and elevator is not added until after the controls have been installed and after they have been covered and painted.

The landing gear may be completed now, and all that remains to be done here is making the leg fairings and the leg-to-fuselage fairings. The left hand one of the latter has been detailed 1/2 size on Page 1, and is cut from a block of balsa as shown. The right hand one is, of course, opposite. When these are fitted to the fuselage, cut a slot in the inside for the landing gear wire clearance and make it quite large. There is danger of the landing gear splitting the fairings in landings if the slot is too snug.

The leg fairings are simply pieces of stiff paper bent into a streamline, and cemented to a wood trailing edge. Make them plenty long, and trim one end to fit around the leg-to-fuselage fairing. Punch a small hole for the 2-56 round head screw that holds the fairing on and cement a washer here. Trim the lower ends to fit the wheels; notice that the upper ends are not attached to the leg-to-fuselage fairing in any manner whatsoever. They remain free to move around, and thus minimizes tearing when the landing gear is bent in hard landings. Normally they will last the life of the airplane, but in case it is necessary to replace either of them, use the old fairing as a template for the new one.

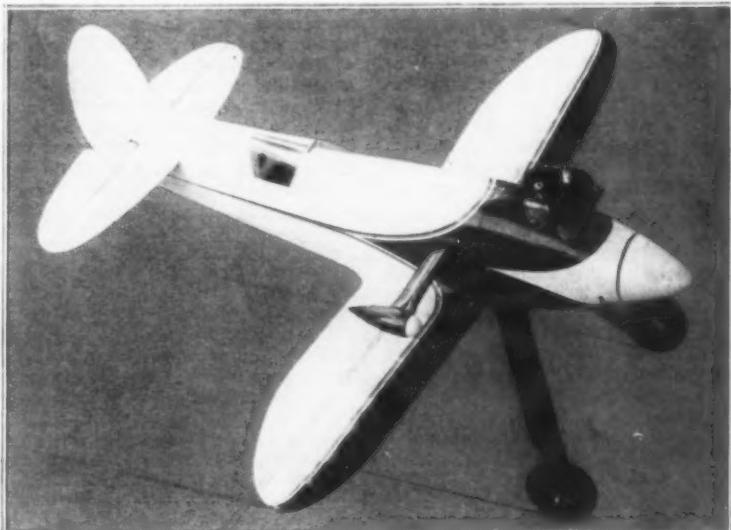
Well, everything has been made except the wing, so let's get busy on it, and get this model flying by next Sunday.

Wing: We hope the gull wing has not scared you out of making this model, because it is really no harder to build than an average wing. We will begin by making the center sections of the front and rear spars as shown in Sections M-M and N-N respectively. Points have been dimensioned from the center-line and from the base, and if lines are faired between these points similarly to what is shown, a beautiful gull follows naturally. Neither do you have to worry about angle of incidence. These spar center sections can be contoured roughly with

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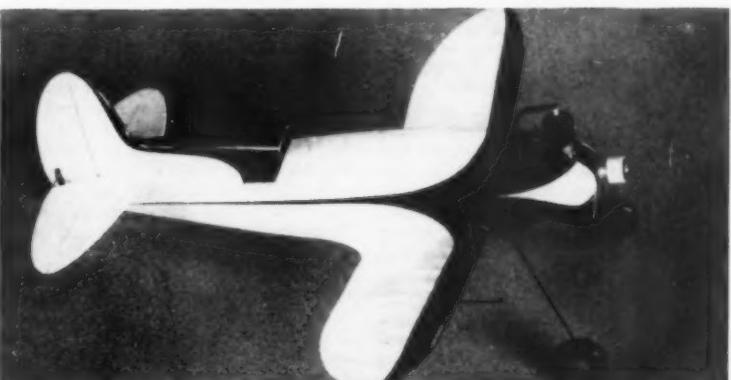
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a scroll or jig saw, and finished with sandpaper or a file. They should be made of spruce, but 1/8 plywood is as good. Locate the tubing by putting the spars on the fuselage and marking carefully the center lines. The tubes are 1/4 O.D. aluminum and are fastened with brass clips, screws, and nuts, just as were the fuselage shear pin tubes. Assemble the spars, the base-plate which is cut out, and the center rib between the spars, which is shown in Section O-O, with brads and glue. These parts are 1/8" thick and may be made of hard balsa, pine or plywood. Now put this assembly on the fuselage and line up the tubes with shear pins. Drill the screw holes from the clips, being very sure that the spars are horizontal. You can line them up by sighting them against the horizontal stabilizer—which we hope is horizontal. After bolting the tubes on, coat them heavily with cement; it is a good idea to do this to the fuselage shear pin tubes also.

While this assembly is drying, make the outer wing spars. Choice of wood is optional here also. The spars are each 3/16" thick, and in height they are exactly 3/16 narrower than the ribs they intersect. Knowing this, lay out the length between Stations 4-7/8 and 20-7/8, and then the widths in this manner. The center line of the front spar at Sta. 4-7/8 is 2" aft of the leading edge, and referring to the table of rib offsets, we find that at a distance of "Y" = 2", the thickness of the wing is about .376 + .689 = 1.065 or 1-1/16. The front spar is 7/8 wide at this point. The widths at the rear spar Stations 4-7/8 and 20-7/8 and at the front spar Sta. 20-7/8 may be calculated in the same way.

Assemble the outer wing spars to the center section by means of the bolts shown. These are 4-40 or smaller, and large washers are used under the heads and nuts. At the rear spar splice a wedge will be required as a filler. Check the dihedral of 4° by using blocks to raise the spars to the correct level. If the rear spar is raised to where the angle of incidence is 0° or even -1/2°, the variation in angle of incidence from +1-1/2° at Sta. 4-7/8 to the tip rib is constant and a very nice twist is built in. Aerodynamically, this will improve the performance of the model by cutting down the stalling angle to a minimum. After this dihedral has been determined, cement the splice joints thoroughly and when they have dried, bind them with strong thread and put on another coat of cement.

Making the ribs is easy except for perhaps the initial step, which is making two rib templates out of sheet aluminum, brass or heavy tin. The two templates are made for Stations 4-7/8 and 20-7/8. Draw these full size on paper, using the offsets given in the table: i.e. on the base line measure a "Y" distance of .913 for Station 4-7/8 rib and find the upper and lower ordinates as +Z and -Z; these are .266 and .587 respectively. Paste this paper outline on the metal to be used for a template and trim as close to it as possible with shears. File down to the line and you have two perfect templates of an N.A.C.A. airfoil No.

23012.

To make the ribs, pile as many thicknesses of 1/16 sheet balsa or 1/32 pine or bass wood as are required to make the ribs, including the false ribs. There are fifteen in all, not counting the rib stations for which you have made templates; these may be made separately. Drill through this pile of material from holes that have previously been drilled in the templates and hold the pile together with two screws and nuts. Of course, the tip template should be centered on the root template to make a uniform job. Using a rough sandpaper block, sand down the ribs to the templates in spanwise strokes. Smooth off with finer sandpaper all around and then remove the screws— behold! fifteen ribs, all alike in contour but varying constantly in chord and height. Mark all the ribs as per station number and trim to the correct length and put in the spar cutouts. Lightening hole cutouts are, of course, optional. The false ribs are shown extending as far back as the front spar, but they may be left as full ribs, if desired. They make more work, but are certainly worth it when it comes to covering the wing.

The tip ribs are shown in length and height, and are simple streamline forms. The leading edge is 3/8 x 5/8 maximum and is sanded or planed to shape after being glued on, depending on whether balsa or bass wood is used. The center section leading edge is contoured and has the same gull as the front spar. A thick former fills the gap between the leading edge and the fuselage bulkhead at Sta. 5-3/16. The trailing edge is continuous from center line to Sta. 20-7/8 and is 3/8 x 3/16 sanded down after being glued to the ribs. The same holds true for the tips. The center section on the original model was planked with balsa in the same way as the fuselage. Some of the corners and edges are a little hard to see, and even harder to explain; but once the planking is in progress it becomes much clearer to see and is almost too simple. After the center section is planked, sand it down and dope just as was done with the fuselage. Some fillets may have to be filled with wood dough, but when finished, the appearance of the gull wing will be well worth all its trouble. The original wing was very strong and light, weighing only seven ounces, complete.

In Section P-P, it will be noted that two control line fair-leads are shown. Make these out of 1/16 pine and cement them to the rib at Sta. 8-7/8.

Control Installation: The details of the controls installation are shown on Page II of the plans, and are half size for clarity. Make first the bell-crank, which as noted may be made from fiber or aluminum sheet. The bellcrank is mounted on a 1/8 x 3/4 piece of pine which is cemented in the fuselage as dimensioned on Page I. When screwing the nut on, do not tighten it too much. Leave the bellcrank free to turn easily. Secure the nut with solder.

The control rod is 1/16 diameter wire. If possible, it should be of hard aluminum wire, but steel wire may be used. The forward end is bent down and then forward again so that it will lie in the hole

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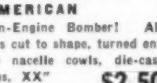
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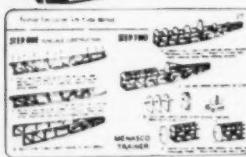
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in the bellcrank. There are three holes in the bellcrank for this purpose, and it is recommended that the hole nearest to the center be used during the first flights. Later when more control is desired, the other holes can be used. The aft end of the control rod has a brass tab soldered to it. The elevator horn is a piece of fairly soft 1/16 diameter wire, such as is commonly found on crates. It is bent into an "L" and the upper end is flattened and drilled. Push the aft end into the center rib of the elevator and cement and bind it well with strong thread.

On Page I, the elevator hinges are detailed half size. There are three of these, or six leaves, and they are made of tin. Use a straight pin for a hinge pin and bend the tin around it in a vise. Use the edge of a file to cut the notches while the hinge is still in the vise. After removing from the vise, trim one tab shorter than the other and solder along this edge. The outer hinge halves are pressed into knife slots in the pine blocks. The forward center half is pressed into a knife slot in the horizontal stabilizer spar and stiffener, and the rear half in a knife slot in the elevator spar and center rib. Drill small holes vertically through the blocks and hinges and push in a straight pin. Snip

off the pin ends and file smooth; covering and dope will keep the pins from coming out.

Put the elevators on by using straight pins for hinge pins. The control rod is now put through a large hole drilled through the planking at about Sta. 28. Be sure the rod is straight between elevator horn and bellcrank, and enlarge the hole lengthwise if required. It may be very neatly concealed by a "clamshell" made of balsa. Pin the end of the control rod to the elevator horn and bend the forward end of the rod to fit the bellcrank holes. Check the movement of the bellcrank and elevators, and if necessary, put small screws in the bellcrank mounting plate to serve as stops for the 5° down and 10° up positions of the elevators. A control rod fairlead is used in the cockpit area and consists of two pieces of wood with slots cut in them and then cemented between the longerons and together so that the control rod rubs slightly in the slot.

Bear in mind that this is only a preliminary controls installation and that the final installation is not done until the model has been covered and painted.

Ignition and power plant notes: It has been our experience that model builders

all have different ways of hooking up an ignition system. Of course, there is only one way that a sparking system can be rigged, but such things as switch locations and booster plug locations are quite variable. However, a few notes on the installation and location of the various components are certainly not out of place here. The location of the coil and battery assembly is dimensioned. This is approximately right to maintain the correct C.G. but of course the unit may be shifted forward or aft for proper balance. The coil and batteries may be taped to the engine mount. The condenser may be mounted between the stiffeners forward of the battery unit and as mentioned previously, the switch is mounted on the engine mount somewhere forward of Sta. 5-3/16 bulkhead. It may be that some of you wish to add a flight timer; if so, this also should be added forward of Sta. 5-3/16. The booster plugs are shown mounted on the right hand side of the fuselage, and the lead wires are soldered to the brass clip and washer aft of Sta. 12 3/4 bulkhead.

One convenient feature of this model is the completely removable power plant. To remove the power plant, it is necessary only to remove the four screws between Sta. 5-3/16 and 7-3/4; then with a slight pull,—mount, cowling, propeller, in fact everything except the booster plugs is free. However this is of no use unless an engine stand is made. It is simply a heavy wood framework with engine mount support and bulkhead just as in the airplane. This will require a little more work, but the ease in troubleshooting the power plant is well worth it.

Covering and painting: The control surfaces and wing of the original were covered with silk; a good grade of tissue may be used also. Cover the elevators separately but put the rudder on the fuselage before covering. This is done so that the brass strip rudder hinges may be glued inside.

The color scheme of this model is conventional U.S. Army warpaint and while we dare not give you paint specifications or number, we may say that it is dull Olive Drab on the upper surfaces of the wing, horizontal tail surfaces and upper two-thirds of the fuselage. The remainder is a dull neutral gray. Refer to the pictures for color demarcation and also color pictures of any U.S. Army war planes may be consulted. Star and circle insignia are on both sides of the fuselage and on left hand upper and right hand lower wing surfaces.

Plane number may be painted on the vertical stabilizer and any individual markings may be added to suit your fancy.

Two coats and a touch-up should take care of the painting very well. Do not try for a shiny surface, because that is strictly un-military.

Final Preparations: We take it for granted that you have already gotten the power plant to function perfectly, so it remains but to hook up the controls. First of all, the elevators are added and the hinge pins inserted. Bend up the pointed ends of the pins and ship off, leaving an over hang of about 1/8 inch. Next,

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thread the control rod through fuselage opening, bulkheads and fairlead and connect to the bellcrank. The elevator horn pin is a piece of small diameter music wire bent and installed like a cotter pin. Its spring loading will help to take the looseness out of this connection.

The lead-ins for the control lines may be six-strand fishline and are threaded through the eyelets in the fuselage and tied securely to the bellcrank. A little rubber cement over these knots will prevent them from unraveling or coming loose. They should be checked often during the life of the model for fraying or wear and the least suspicion of wear should call for immediate replacement. Be sure these lead-ins are long enough so that the attachments to the control lines are well outside of the wing fairleads. The sport of fishing has furnished us with some fittings which are perfectly suitable for the control line attachments in the form of swivels. These come in various sizes and may be gotten at any dime store.

Put the wing on with hard balsa shear pins made out of 3/16 square stock and hook up your control lines. The lines should not be longer than sixty feet for this model and fifty feet is about the best length.

Well, from now on it's up to you. Here's hoping you have many successful flights.

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Flash News

(Continued from page 2)

downed. The mighty sea fortress is just as powerfully armed against enemy surface vessels, for in a single attack by three Japanese cruisers, all of them were sunk in short order. Other vessels of the South Dakota's class are now in action and one, soon to be launched, is even mightier than the South Dakota!

News of new German "secret weapons" has wearied the Allies for the past year but recent reports seem to indicate the actual existence of at least two new weapons, both remotely-controlled by an operator in the vicinity. A new anti-tank land torpedo has been developed which resembles a small tank about the size of a motorcycle side-car. The torpedo carries about 150 pounds of explosive and is controlled by a cable reeled out from it as it moves forward. The cable is connected with an operating station in a position of safety. At the desired moment the torpedo is set off. The Russians, in their very straightforward manner of dealing with Nazi weapons (as well as soldiers) report their solution is to slip behind it and cut the cable, thereby rendering it powerless.

In the air-way category, the Germans have developed a radio controlled aerial torpedo equipped with wings which is guided into the midst of a Fortress formation and exploded. This weapon is not noted for accuracy and Fortresses cope with it as they do with enemy fighters, by shooting it down with their powerful batteries of .50-caliber machine-guns. They pronounce it easier to hit than enemy fighter due to its lack of maneuverability. Few have been reported in action.

Naval authorities have reported a third new Nazi weapon, a conventional torpedo which is fired towards an Allied ship but which is equipped with a fuse detonated acoustically by the vibrations of the ship's propeller rather than by contact with the hull's surface. In this manner the torpedo is exploded at some distance from the Allied ship, anywhere within range of propeller vibrations. The purpose of this weapon is to shatter the ship's propeller, causing the ship to lose headway and finally drift, at which time it becomes easy prey for a conventional torpedo fire into its sides point blank. The success of this weapon has not been announced. A similar device is a magnetic torpedo which is supposedly drawn to the ship by magnetic attraction. Both air and surface forms are reported.

Although it is true, to some extent, that promotion in the armed forces is accelerated during wartime, the ranks of present war leaders should not be taken, *per se*, as evidence of this fact. Particularly is this true in the Army, where we now find such a galaxy of three and four-star generals in the various theaters. These ranks are temporary ranks which, while carrying privileges and pay of the rank, are abrogated upon cessation of hostilities and the holder reverts to his former rank. It is interesting to note we have had less than a dozen full four-

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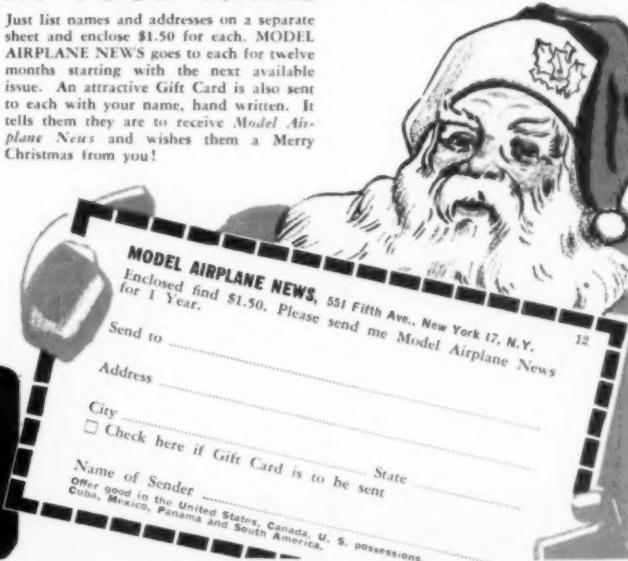


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star generals in our nation's entire history. The following promotions in permanent rank indicate this practice among our present high-ranking officers: Lieutenant General Carl Spaatz, commander of the Northwest African Air Forces, has been raised from colonel to brigadier general; Lieutenant General George C. Kenney, commander of the 5th Air Force in the Southwest Pacific, has been raised from colonel to brigadier general, and Lieutenant General Mark W. Clark, commander of the famous American 5th Army in Italy, has been promoted from Lieut. Colonel to Colonel and, thence, to Brigadier General.

The imminence of action of the first of the new "super bombers" announced by General Arnold in a recent speech, is evidenced by the announcement that new bases are being rushed to completion in England from whence these giant ships will operate against Germany. It has been announced the first of these monsters will be flown directly to the new bases in England from America complete with flight crews and armament ready for action.

Douglas Aircraft recently turned over another page in its log book by the celebration of the nineteenth anniversary of

the historic first Round-the-World flight in 1924 of a group of four Douglas world cruiser planes. The New Orleans was trundled from the Los Angeles Museum to Santa Monica, California, home of the parent plant of the huge firm, and parked under the wing of a giant Douglas C-54 Skymaster four-engine transport. Col. Eric Nelson and Jack Harding, now a Dallas business man, were on hand for the celebration. The original flight started from Seattle on April 6th, 1924 and finished at Seattle on September 28th, 1924. Several Army and company officials delivered addresses and company workers gathered during lunch hour for the ceremonies.

According to Don P. Smith, president of Interstate Aircraft, the firm's DeKalb, Illinois plant is now in production on a new-type twin-engine training plane for the U.S. Navy which makes the widest possible use of non-strategic materials, being built largely of composite plywood-plastic construction. The parent plant at El Segundo, Calif. is in full production on hydraulic units, bomb shackles, gun chargers and other precision accessories for various Army and Navy plane manufacturers.

One of the outstanding exploits in the

air war against the German U-boat has come to light with the revelation that Lieut. Robert Pershing Williams, 26, of Snoqualmie, Washington definitely sunk three enemy submarines and attacked a fourth which was listed as "possible damage". Williams, in a Grumman (TBF) Avenger, with a crew composed of radio operator Morris C. Grinstead and gunner-bombardier Melvin H. Paden, sighted the first sub in mid-afternoon. The U-boat was strafed by Lieut. Steiger in a fighter plane after which Williams roared in and straddled the craft with bombs. The raider surfaced and its AA guns were manned, resulting in the downing of Steiger. Williams radioed his carrier-escort and more bombers were sent which finished the job of sinking the mortally wounded boat. About 35 survivors were sighted and 33 were rescued, 1 dying later. The next morning Williams again sighted a U-boat and hurried to the attack dropping his bomb in close. The craft disappeared leaving an oil slick and was listed only as "probably damaged." Two days later Williams sighted a third U-boat and his bomb exploded directly under the craft sending men, oil and debris to the surface. Three prisoners were taken. Grinstead sighted the fourth sub and William's bombs forced it to the surface. From this fourth victim a total of 30 prisoners were captured. The battle of the U-boats has definitely been won and for more than three months not a single Allied ship was sunk by enemy submarine action. With such courage and skill of men like Williams no Allied ship need fear the U-boat again.

A standard Douglas C-53 recently crossed the Atlantic in nine hours, thirty-four minutes to break the existing speed record for transport craft. This time was between the takeoff point in Newfoundland and the Air Transport Command's base in Britain. Aboard was Peter Masefield, noted air correspondent. Bombers, of course, have crossed in much faster time, the record now standing at six hours, twelve minutes.

The Japanese have introduced a new fighter plane in the Southwest Pacific which is somewhat more effective than the famed Zero, according to Senator Brewster, who recently returned from a tour of Pacific bases. This ship is either the Showa, Aichi or Sozukaze fighters, all of which are powered by double-row engines and carry heavy armament. Reports indicate, however, the new fighter has an extremely short range never having been reported more than a few dozen miles from the nearest enemy air base.

A new torpedo plane, the Sea Wolf—the most powerful of its type in the world—which was announced by the Navy recently, will be built from a design developed by Chance Vought Aircraft Division of United Aircraft Corporation, it has been disclosed. The new craft, a valuable addition to the Navy's arsenal of weapons for smashing Japanese seapower, is to be manufactured in quantity by the Consolidated-Vultee Aircraft Corporation at Allentown, Pa. The prototype of the Sea Wolf, which was designated the XTBU-1, was built by Chance

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Vought and the experimental flight tests were carried out by Vought. The Sea Wolf is the product of the same engineering staff which developed the Navy's famous Vought F4U-1 Corsair shipboard fighter which is playing a vital role in the current offensive drives against the Japanese in the South Pacific.

Announcement of the new torpedo bomber was made recently by Rear Admiral Ralph Davison, Assistant Chief of the Bureau of Aeronautics, in a speech dedicating the new Convair Field adjoining the Consolidated-Vultee Aircraft Corporation plant. Describing the Sea Wolf as "the last word" in its line, Admiral Davison said: "Eight tons of fighting power is a lot of power when it is used intelligently. And you can believe me when I tell you that we have the best trained and most intelligent pilots in the world. Carrying a crew of three, pilot, gunner and radioman-bomber, the Sea Wolf incorporates everything we have learned about planes of this type. It is powerfully armed with guns to defend itself. It is well armored. And it carries the deadly tin fish, which the Japs make futile efforts not to catch, or a load of bombs which makes them equally unhappy. The performance of

the Sea Wolf, its speed, range and ability to climb to operating altitudes, I cannot, of course, discuss in detail. Suffice it to say that there is no other torpedo plane in the world to match it!"

VICTOR Y

Douglas P-70

(Continued from page 25)

The Model 7 was first conceived in 1936 by John K. Northrop and his engineering staff headed by E. H. Heinemann when the old Northrop Corporation was located at El Segundo (Los Angeles) California. It was an original proposal planned for submission to the (then) U.S. Army Air Corps, but in the Fall of 1936 the project was dropped and design efforts centered on the popular series of single-engine attack planes of the firm as represented by the famed A-17 attack plane. In the Spring of 1937 the project was again introduced into the design room and extensive work done on it but that Fall it was again shelved. In 1938 the Army Air Corps issued a design specification inviting bids for a competition to be held for twin-engine light bombardment and attack airplanes. The Model 7 was again pinned to the drawing boards and extensive changes made to



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conform to specification.

In September of 1938 the plane was completed and made its experimental test flight in the presence of both Army Air Force and French L'Armee de l'Air officials. So pleased were the French representatives that, after test flights, they signed, with U.S. approval, a contract calling for the construction of 100 machines.

At this time the Douglas company was reorganized with Northrop leaving the firm and its becoming known as the El Segundo Division of the parent Douglas Aircraft Company. Northrop was joined by financial and engineering experts and formed his own firm in nearby Hawthorne the following year, where he is presently engaged in design and construction of several military airplane projects for the Army Air Forces.

The plane was then re-designated the Douglas DB-7 and construction was under way. The original machine met with an unfortunate accident in the Summer of 1939. With Douglas test pilot Johnny Cable at the controls and French representative Captain Paul Chemedlin as observer, the craft was circling to land at Mines Field, El Segundo test field, when an engine failed. Cable attempted to turn into the field with the good engine on the high side of the turn, lost control of the craft and it crashed into a row of parked cars at adjacent North American Aviation, Inc. and was destroyed by fire. Cable lost his life but an investigation determined that engine failure, alone, was the cause of the crash and the contract for the model was continued. The first production model came off the line in August, 1939; the first production bomber to be equipped with a nose wheel as well as the fastest bomber of its type ever built. Contract for the French versions was completed and some of these ships, known as DB-7Bs, saw action in France prior to its collapse.

The United States Army Air Forces, after a thorough examination of the craft's success in France, signed a con-

(Continued on page 56)

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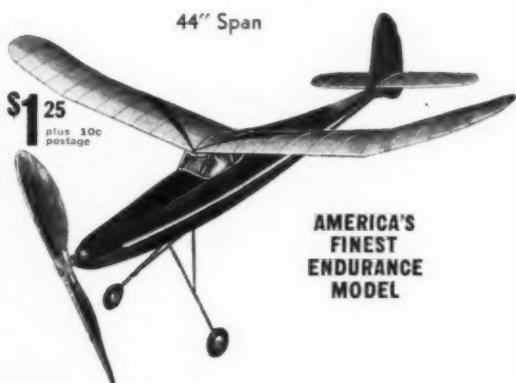
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Douglas P-70

(Continued from page 52)

tract for a quantity to be known as the Douglas A-20. Shortly thereafter the British Government signed a contract for a quantity to be known as the Douglas Boston.

Production lines were designed, the ship was broken down into a large number of component parts for ease of assembly, chief of which was the division of the fuselage into two halves, split along the longitudinal vertical plane, to permit workmen to install the various lines and fittings in both halves simultaneously.

In the British Royal Air Forces the ship became known in successive models as the Boston I, II and III, all basic bomber versions of the ship. In the Spring of 1941 a special version was designed in which the bombardier compartment, located in the nose, was eliminated and a battery of machine guns installed in a new, longer solid nose. This machine was designated the Havoc I by the British and a later version, the Havoc II, is now in action with the British Royal Air

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Force, as a night fighter used on intruder operations against the lowlands. The U.S. Army Air Force developed the ship through the A-20A, A-20B and A-20C, each successive refinement making improvements in performance, equipment and combative power.

The latest version of the ship is known as the P-70 and is actually an Americanized version of the British Havoc II, if it could be called such. And the P-70 is our Plane-on-the-Cover this month.

The Douglas P-70 is a mid-wing twin-engine two-place fighter craft equipped with tricycle retractable landing gear and heavy armament located in the nose.

The wing is divided into seven parts, two inner wing panels including the engine nacelles, two outer wing panels, mounting the ailerons, and a fuselage section which consists of spars only, to which the wings attach. The outer wing panels are of conventional pressed flange rib and extruded section spanwise stiffeners attached to a single main spar. This spar is the heavy cap strip and web design and is unique in that the spar caps themselves are carefully machined and compose the wing skin itself,

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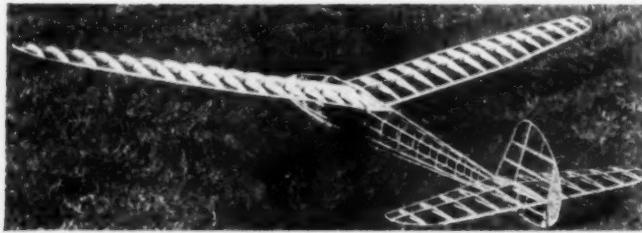
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the wing skin being attached to it along its front and rear edges rather than covering altogether as in other types. The ailerons, which extend from the tips inboard to the inner wing, are all-metal construction, fabric covered. They are statically and dynamically balanced through the use of lead weights riveted to the nose skin, and are equipped with trim tabs controllable, while in flight, from the cockpit. The tips are quickly detachable, being attached with a large number of flat-head screws about the perimeter of the wing contour.

The inner wing panels are the single spar type but a capped shear web is used in the after end to provide a torque box. The trailing edge of the inner wing is made up of the flap panels on either side of the engine nacelle. The engine mount is bolted directly onto the spars and the landing gear trunnions are a part of the steel-tubing engine mount. The engine nacelles are of conventional flanged frame and extruded stiffener construction covered with flush riveted sheet.

The panels are bolted to each other and the assembly to the fuselage through spanwise shear fittings, the bolts lying longitudinally. The entire structure is full cantilever.

The fuselage is built in four sections, nose section housing the armament, main section housing the crew and installed equipment, rear section containing the empennage and the tail cone. All are bolted together to provide east of main-

tenance, replacement and storage. The fuselage is built up on two heavy keel structures which extend forward on either side of the nose wheel supporting the nose gear trunnions and the bomb-bay doors. Solid bulkheads divide the nose section from the main fuselage and the pilot from the rear gunner, thereby prohibiting any interchange of the crew while in flight. This situation is overcome by the provision of dual controls in the gunner's compartment.

Landing gear is the tricycle type, the nose wheel folding aft and up into the fuselage, opening being closed by flat panel doors. The main gear retracts aft and up into the engine nacelles, opening being closed upon retraction by large clam-shell doors. Landing gear operation and control is hydraulic throughout with mechanical emergency systems for cable gear release for emergency down operation.

Tail surfaces are full cantilever, the stabilizers being all-metal structures metal covered and the rudder and elevator all-metal covered with fabric. The vertical stabilizer is particularly large and features a sloping fairing, greatly reducing spinning characteristics. The horizontal stabilizers are the inclined type slanting upwards at a decided angle. Purpose of such rigging is to reduce spinning tendencies. The rudder and elevators are equipped with trim tabs controllable, while in flight, from the cockpit.

The after fuselage portion underneath the tail surfaces is provided with a heavy metal skid to prevent damage in event of a tail-down landing. This type of landing is usually experienced by airmen unfamiliar with the tricycle type, which causes an almost involuntary hauling back on the stick as the ground approaches. However, loading conditions may frequently cause a tail-down landing and such landings are not uncommon. The heavy skid, faired into the fuselage, prevents any extensive damage in the event of a slight dragging of the aft fuselage during a landing.

The P-70 is powered by two Wright Cyclone 14 engines housed in conventional cowlings in each inner wing panel. This engine, a fourteen cylinder double-row radial air-cooled type, develops a maximum of 1,600 horsepower at 2,400 r.p.m. for takeoff. The Cyclone 14 is equipped with a two-speed single stage blower controllable by the pilot. The use of low blower gives a normal rating of 1,350 horsepower at 2,300 r.p.m. and a military rating of 1,600 horsepower at 2,400 r.p.m. High blower gives a normal rating of 1,275 horsepower at 2,300 r.p.m. and a military rating of 1,400 horsepower at 2,400 r.p.m. Latest version of the engine has a maximum horsepower rating of 1,700 horsepower. This power is delivered by Hamilton Standard Hydromatic constant speed propellers of the three-bladed all-metal variety.

Fuel is carried in self-sealing composite fuel bags carried in the inner wing panels. Four separate tanks are provided with a total capacity of 370 gallons in the A-20 version but this is probably increased in the P-70 due to the removal of the nose crewman and

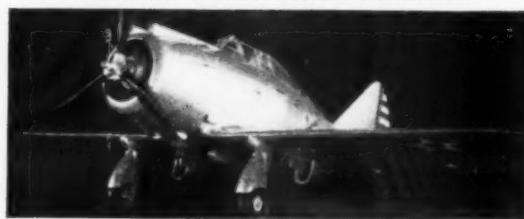
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equipment for bombardment tactics. Oil is carried in self-sealing tanks in the amount of 35 gallons.

The pilot is located in the centre of the ship well forward of the wing leading edge and the plane of the propeller blades. Entrance and exit is provided by a large hinging panel in the top of the fuselage fairing which is equipped with a quick release mechanism for emergency exit. Movable windows on either side provide ventilation and permit conversation with ground crew members while on the ground. Throttle, propeller, blower and mixture controls are located on the fuselage left side. Electrical controls are mounted on a special panel forward of the powerplant controls. The right side of the fuselage carries radio equipment. The flight instruments are located on the center panel forward and below the pilot.

The gunner-radio-operator is located in the ship behind the wing panels.

His cockpit is provided with all radio equipment, a set of dual controls, various operational equipment. Provisions are made for installation of two machine guns on a special swivel mount but these are normally not carried in the fighter version, his duties being principally observation. In the A-20 series, an additional movable gun was frequently installed in the after belly of the ship, the observer moving down to the position in the belly to operate the guns.

Armament aboard the P-70 varies, both machine-gun and cannon equipped versions being reported. In the former version, four .50-caliber machine guns are mounted in the extreme nose. In the latter, four 20 millimeter cannon are mounted similarly. In both versions, an additional pair of fixed .50 caliber machine-guns are mounted in the nose towards the bottom of the fuselage and are enclosed by quick-removable panels for servicing. Ammunition is carried

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(Continued from page 27)

the use of tinfoil and others have used cast aluminum. By carefully making patterns of the longitudinal strips, cutting exact strips of tinfoil to fit the patterns and by carefully gluing the tinfoil strips in its place on the shaped wooden shell, making sure that all strips are evenly placed and that no wrinkles appear, a neat and truly lifelike metal shell will result.

A Brief Description of the Plans

Fig. 1, 2 & 3. The final assembly views give us a good idea of how the model appears when it is completely finished minus the distinctive squadron colors and markings. You will note that the fuselage is part of the wing's streamlining and that the wing's center section is the bottom of the fuselage in that area.

Fig. 4, 5, 6 & 7. These layouts, if they are carefully enlarged to scale, will give anybody, who is redrawing the plans, an exact outline of the whole airplane in three views. Scaling down the actual dimensions is the best and only method of drawing scale plans and these dimensions were put on the plans for this purpose. After the entire plans have been drawn refer to the final assembly views and fill in all missing details.

Fig. 8. The special bottom view was drawn so that the builder can see some details that are not shown on the other main views.

Fig. 9. This gives us a good idea of

how the fixed landing gear of the Model "A-17" appears. The wheels are in the exact location, both front and side views as the "A-17A" wheels. By making the fixed landing gear model, you must paint your model with Army Blue fuselage and Army Yellow wings and tail groups.

Fig. 10. The sections "C-C" to "F-F" are not complete as the wing center section fits to the bottom of the cross sections, making up the space that is shown in Fig. 5. The cross sections should be carefully enlarged into patterns or templates so that the fuselage curve will come out true in a built up or solid model.

Fig. 11. The ribs that are shown in this view will give a good idea on how the ailerons, controls, hinges, flaps and tab units appear on the wing across sections.

Fig. 12. The Suggested General Arrangements were merely drawn so that the super detail builder can easily arrange the cockpit in perfect proportion to the exact arrangement. By carefully planning and building the interior, the finished model will give the appearance of being almost real on the inside as well as the outside.

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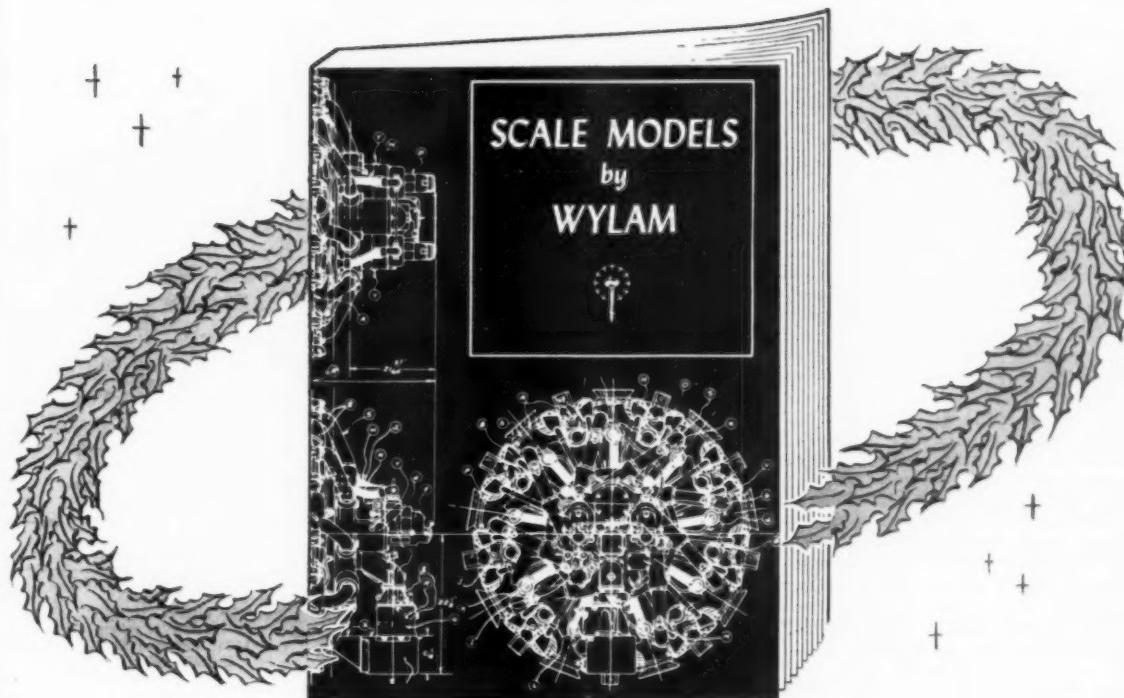
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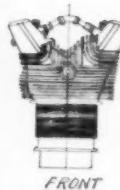
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PA-105 HIGH



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varying from 17 Class C's, 22 Class B's and 11 Class A's for sport flying only. For the coming season Buel C. Carter, Jr., will be taking over the reins of the club. The club would most certainly appreciate hearing from other model builders and their activities."

California

On Sunday, August 29th, the East Bay Aeroneers had their first tow-line and catapult contest of the summer. This was much in the nature of an experiment, for previously the Aeroneers had been strictly a gas model club. Any doubts were dispelled for the attendance was as good as any of the regular monthly gas contests. The day was perfect with just enough wind to make the planes fly nicely. The morning was devoted chiefly to the catapult gliders with many long flights recorded. In the afternoon the thermals really went to work and as a result many planes were lost. Some of the tow-line gliders were equipped with dethermalizers which proved highly effective in bringing them out of thermals.

For the benefit of any model builders in Oakland, the East Bay Aeroneers meet at the Oakland YMCA every Monday night at 8:00. The Aeroneers are still going strong in spite of the war taking many members; they now boast of a membership of over 30 active members.

The new president is Don Foote; secretary, Earl Romak; sergeant, Charles Hubbard.

Results of Contest

Catapult

Dick Diehl, 426-1/4 seconds.
Cooper, 274 seconds.
Kurt Holtzhauser, 239.9 seconds.
Dick Diehl, 212.5 seconds.

Towline

Bud Cope, 233.8 seconds.
Ralph Igler, 155.5 seconds.
Bill Gunther, 130.9 seconds.
Bill Gunther, 116.2 seconds.

Fresno Gas Model Airplane Club Monthly Contest

Class A

Time

John Marshall.....	510 Sec.
Dutch Van Tassel.....	372 Sec.
Bill Dunham.....	232 Sec.
Dan Martin.....	64 Sec.

Class B

Red James.....	350 Sec.
Bill Dunham.....	304 Sec.
Tom Jenkins.....	283 Sec.
Tex Marbut.....	194 Sec.

Class C

Jack Soldani.....	711 Sec.
Paul Nieto.....	657 Sec.
Ted Winter.....	600 Sec.
Jack Weems.....	414 Sec.

Juniors

Bud Warner.....	210 Sec.
Jim Dugovic.....	187 Sec.
Vic Enns.....	110 Sec.

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and flying models a little while back?
. . . that's HIM UP THERE!*



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CYLINDER

Do not remove or try to replace cylinder. It can only be removed or installed at factory.

PISTON

Remove piston only when cleaning inside of motor. In replacing, make certain baffle is on side opposite to exhaust port.

TIMER

Keep normal tension on timer arm by periodic checking of screws. The hardened steel Moving Breaker Point will break if attempt is made to bend it in order to adjust point gap. If gap is too great, install new washers. If gap is too small, tighten Stationary Breaker Point nut.

PROP NUT

Looseness of the prop nut will often cause cranky starting. Be sure propeller is fastened securely with nut and washers tight.

IGNITION WIRES

Ignition wires should be of stranded copper wire obtainable from your dealer. Make certain all connections are properly soldered.

SPARK PLUG

Use 12 pt. box wrench in removing. When replacing plug, be sure to replace washer also.

FUEL TANK

Keep tank, cap and spring clean at all times.

INTAKE TUBE

Leave clearance all around intake tube so that it will not be damaged in event of crash landing.

FUEL MIXTURE

Use only recommended fuel mixture of 3 parts gasoline to 1 part SAE 70 oil. Gas tank is soluble in alcohol.

MOUNTING SCREWS

Use machine screws (2-56) with plenty of clearance in mounting slots so mounting lug will not be forced and broken. Always use mounting plates on top of beams. However, in any event, radial mount is preferable.

COIL & CONDENSER

Mount ignition coil no further away than length of standard high tension lead. Condenser should be as close to points as possible and grounded directly to engine.

CLEANING YOUR OHLSSON

Clean entire motor after each flying period with brush and cleaning solvent. When plane lands in dusty, dirty field, DO NOT TURN ENGINE OVER UNTIL IT HAS BEEN THOROUGHLY CLEANED. After each landing, inspect motor to see if foreign matter is lodged in any parts.

When will there be NEW Ohlssons? Your guess is as good as ours. We hope—soon, and perhaps there will be an important announcement in an early issue of this magazine, but we can't say for sure.

Meanwhile, it's just good business to keep your

present Ohlsson in top running condition. One of the early 23's ran 426 hours continuously without replacement or failure of any part! Give your Ohlsson the care it deserves and get the kind of service it was designed to give!

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